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

Module 8
Public sector and Conservation
Lecture 3
The design of the tax system

Namaste! We carry forward our discussion on Public Sector and Conservation and in this lecture, we shall have a look at The Design of the Tax System. Now, we know that governments spend money on conservation or things like environmental protection and in certain cases, the total amount of spending is pretty substantial. So, countries in the European Union spend like 1.2 to 1.4%, in some cases less, in some cases more of their GDP, a percentage of their GDP into environmental conservation.

If the GDP is large, the total offset for conservation also becomes large. Similarly, when we look at the sustainable development goals, then the world spends to achieve those sustainable development goals. In our country, this news article says the environment ministry gets rupees 3100 crores in 2020-21 of which 460 crores were allotted to control pollution. Now, the thing is 3100 crores is not a small amount. The question is where is the government going to get this money from?

Similarly, this article says in the Karnataka budget, we have a survey of the shola forest to conserve diversity and we have observed in one of the earlier lectures that the shola forest are a very unique ecosystem in which we have grasses and we also have the trees and they are in a dynamic equilibrium. Now, because these are very unique ecosystems, they have certain specific requirements and the governments are paying key to those requirements. But then, where is the money going to come from or this one?

As the government plans to use 75 percent of MGNREGS Work to Conserve Water. So, what the government is doing is that it is using this scheme of MGNRDEGS for water conservation, which means that a particular portion of the budget is being used for conservation purposes.

In this case form is the conservation of water. Government sanctions 305 projects for clean Ganga Mission. Here again, we are spending money on the cleaning of the Ganges river. Clean Ganga mission gets a boost. Varanasi sewage plant to clean 14 crore litres of wastewater every day.

In this case, the government is using money to set up a sewage plant and the sewage plant is going to perform water treatment. Now, this is important for conservation. But here again, all these things require money. Forest department to set up the world's first mangrove zoo at Jharkhali, all of these requirements. And this money comes primarily from taxes, which is why a

study of taxes is very important for the study of or for the implementation of conservation.
Because we are getting money for all these conservation activities, primarily from taxes. So, it becomes important to know what taxes; what are the pros and cons of the tax; how should the government decide how much amount of tax to impose on people; who is going to pay the taxes; are the rich people going to pay the taxes or are the poor people going to pay the taxes or are we going to have a system in which everybody pays the same amount of tax; how do we decide between these things.

Because these are important, they have important ramifications for conservation. So, we need to understand them in the context of conservation economic system and the most important point about taxes is that taxes have deadweight losses. So, to review what we saw earlier was that when the government imposes a tax only on the sellers. So, in that case, the government can say that whenever there is a sale of a good, then the seller will have to pay such and such amount on every sale to the government as taxes. Now, when that happens, the cost to the sellers to sell the good increases, which is shown by this left shift. So, the supply curve is shifting to the left and the amount of the shift is given by the amount of the tax. So, more the tax, more is the shift.

Now, even though the government is imposing this tax only on the sellers, what we are observing is that this tax is getting distributed between the buyers and the sellers which means that earlier, we were having this equilibrium. So, this was the natural demand and supply equilibrium which was giving us the price without the tax and it was giving us the equilibrium quantity that was demanded or supplied by the market. Now, the supply curve shifts to the left because of the tax.

This is the new equilibrium. This is the price that buyers have to pay to get the goods and because of this left shift, we also observe that there is a reduction in the quantity that is demanded or supplied. So, essentially what is happening in this case is that the market has shrunk. The market has reduced in size because now, there are lesser goods that are demanded and supplied in the market; now, that is going to have an impact on the society.

So, even though the government is taking this money from the sellers, one of the reasons to have this money is also conservation. So, the government is taking this money from the people, in this case only the sellers for the conservation purposes; but this is leading to a shrinkage in the market and the price that the sellers get can be figured out by drawing a vertical from the equilibrium with the tax, it cuts the supply curve here. So, this is the cost of making the goods and supplying the goods by the sellers.

This is the price that the sellers pay. And even though the tax was imposed only on the seller, this tax gets divided. This is the seller's sphere, which is the price without the tax that they were getting minus the price that they are getting when the tax has been imposed.

This is the seller's share and we also have a buyer's share which is the price that the buyers are paying now minus the price that they were paying without the tax. So, in short, what is happening here is that even though a tax has been imposed only on the sellers, we are observing that it gets distributed between the buyers and the sellers and the market shrinks. There are now lesser quantities of goods that are demanded and supplied in the market.

A very similar thing happens when the tax is imposed only on the buyers. Now, when the tax is imposed on the buyers, the demand curve of the buyers shifts to the left. Because now things are becoming more costly, because people will now have to pay more; because they will not have to pay just the seller, but they will also have to pay the government in the form of the tax. So, in this case, the demand curve is shifted to the left.

The supply curve remains the same and here again, we observed that this is the normal equilibrium, the equilibrium without the tax and this is the new equilibrium. Now, in the equilibrium without the tax, this was the quantity that was demanded or supplied and this was the normal market price.

When the equilibrium shifts, then a lesser quantity is demanded or supplied. So, what we are observing here is that when the tax is imposed only on the buyers, then also the market shrinks; lesser quantity of goods are now demanded and supplied in the market and another thing that happens is that the price that the sellers will get is given by the point, where this new demand curve is cutting the supply curve. Now, the supply curve in this case does not shift.

So, this is the price that the sellers pay. And to get the price that the buyers must pay, we can draw a vertical and this vertical cuts the demand curve at this point and this is the price that the buyers will have to pay. What is happening here is that when the government is putting a tax only on the buyers, then the buyers will have to pay this amount to the sellers and the buyers will have to pay a certain portion to the government so that the total price that they have to pay is much higher.

Now, here as well the tax burden gets distributed because the new price that the buyers have to pay is this, the price they were paying before was this. So, this difference between the enhanced price and the earlier price is the buyers share and similarly, earlier the sellers were getting this much amount, now they are getting this amount.

This difference between the new price that they are getting which is this one and the earlier higher price that they were getting, before the tax, this is the sellers share. So, in short what is happening is that even when we have a tax only on the buyers, here as well the tax gets distributed between the buyers and the sellers and the market shrinks.

We can say that whenever there is a tax, the size of the tax together with the elasticity of the demand and supply curves will determine how much is the buyer's share and how much is the seller's share. So, the size of the tax is less, then both buyers and sellers will have to shell out a lesser amount of money.

If the size of the tax increases, they will have to give more money and whether the buyers have to pay more or the sellers have to pay more is determined by the elasticity of the demands in supply curves. But whatever happens, whenever there is a tax, it would lead to two things; one, it will get distributed between the buyers and the sellers and two, the market will shrink. And this shrinkage also leads to a shrinkage in the surplus.

We have observed before that whenever there is a tax, then the government gets a certain amount as the tax revenue. This tax revenue is determined by the size of the tax which is this much. This is the size of the tax, T and the quantity that is I mean traded in the market that is bought or stored which is Q.

Now, multiplication of Q which is the quantity demanded or supplied with the T or the tax size will give us the tax revenue. Earlier, we were having a situation in which we had a large consumer surplus. It was given by this triangle and a large producer surplus, which was given by this triangle.

But in the new situation, what is happening is that now, we have a reduced amount of consumer surplus which is now given by this triangle. So, earlier, we had a larger consumer surplus, now we have a smaller consumer surplus. The producer surplus also reduces.

This is the new producer surplus that we have. So, it also reduces; a certain amount gets accrued to the government in the form of government revenue and we also have a deadweight loss because of this taxation, which is this gray color triangle. So, earlier, where we were having a large producer and consumer surplus, now the producer and consumer surplus have reduced. The government is getting a certain amount of the surplus in the form of tax revenue; but there is also a deadweight loss.

The government when it is taking money in the form of taxation, the government will have to make certain decisions. Now, we had observed before that economics is the science of making decisions. So, economics helps us answer things like what to produce, how to produce, how much to produce, for whom to produce, when to produce and things like that. Now, similarly, when we are talking about taxation and the government needs taxation for its own work ins.

And it also needs taxation money for conservation purposes and the government is doing conservation for the people. But then, when the government takes money from the people to do conservation for them only, then in this process the government also reduces the total surplus in the market.

The government gets a share of the surplus in the form of tax revenue; but it also creates a deadweight loss. Now, the question for the government is if we are taking these taxes from the people to work for them and in this process, we are also reducing their surplus, which is their welfare; then, how do we decide how much amount of money to take from the people? That becomes an important question. Because any maximization of the tax revenue can only happen by increasing the deadweight losses.

This now is an important question for the government; how do we increase the tax revenue, while keeping the deadweight losses at a low level and we saw that deadweight loss is the fall in the total surplus that results from the market distortions, such as taxation.

What is happening here is that if the government does impose a tax, then it distorts the market. We saw that the earlier quantity demanded or supplied in the market was large and after the imposition of the tax, the market shrinks. So, this is a distortion in the market.

Now, any such distortion in the market is going to reduce the total surplus that is there in the market and this reduction in the total surplus that results from a market distortion such as taxation is known as a deadweight loss. Now, taxes cause deadweight losses because buyers and sellers are prevented from realizing all the gains from the trade. Now, all the gains from the trade would mean this total surplus that was accruing to the buyers and the sellers earlier.

This was the total surplus that was being accrued earlier, but because of this deadweight loss, now there is a reduction in the surplus. Taxes cause this deadweight loss because buyers and sellers are prevented from realizing all the gains from trade and this loss of surplus does not even accrue to the government, since trades that become uneconomical due to the taxes do not occur at all. So, now the question to the government is how do we maximize our taxes.

While ensuring that the deadweight losses are kept at the minimum. And in this context, we can talk about the Laffer's curve which tells us that when the size of the tax is small, that is T is small; with small T, Q will be large. Now, Q as you will remember is this much, this is Q. So, this much is Q. Now, if T reduces, then Q increases which means that the mode you increase the size of the T which is the tax size as it increases, the market shrinks even further.

The shrinkage of the market is related to the size of the tax. Now, when we have a very small tax that is T is very small, in that case Q is large; but then because T is very small, so Q into T in total is small. So, what that means, is that when T is small, then the total tax revenue which is given by this pink colored rectangle, it is small. Now, a situation of a very low amount of T is not good for the government because in this case, the government will not get a sufficient amount of money in the form of taxes.

Most of the countries do not have a very small value of T; T is pretty substantial because when the T is very small, then the government would think that ok if I increase the amount of T by say a small value, then there will be a shrinkage in the market.

But probably that shrinkage will not be that large, which means that I should be able to increase the amount of my tax revenue without making a very big distortion because T today is very small and when the government has such a thinking, then the government would try to increase the value of T.

When the government increases the value of T, then it would lead to further shrinkage of the market. So, when the government increases the T to a medium level value, then we can observe that the tax revenue, here the tax revenue was very small, now the tax revenue has increased.

When the T increases even further, then probably you can have an even larger amount of tax collection. But then, this cannot go till infinity. Because for a very large value of T, Q will become so small because now the market has shrunk to only this much.

This is now the size of the market; whereas, earlier the size of the market was as large as this. The increase of I mean this larger market, now we have only this much of a market shrink and when the market has reduced to such a large extent, it means that Q is now very small.

Even with a large size T, we will see that Q into T again becomes very small. So, what we are getting from this is that a very small value of T will not provide sufficient money to the government; a very large value of T will also not provide a sufficient amount to the government.

The government should go for a value of T that is in between and this brings us to the Laffer's curve. Now, Laffer's curve is a plot of tax size on the x axis versus tax revenue on the y axis. So, Laffer's curve tells us that as the size of the tax increases, the revenue collected reaches a peak and then starts to decrease and for a very large tax size, we will have a very minuscule amount of tax revenue. So, when we say that economics is the science of decision making.

This Laffer's curve is one indication of up to the government about how to design the tax system. So, a very important consideration that we are getting from Laffer's curve is that the government should have a value of T that is neither very small nor very large, if it has to have a sufficient amount of tax petty.

But the government cannot just work on tax maximization. Now, this is because of the deadweight losses and what we had observed was that in the case of a very small T, the deadweight loss is very small. So, this gray colored triangle, this is the deadweight loss. Now, when T is very small which means this height is very small.

Then we have a very small triangle. But when T increases, the deadweight losses.increases. When T increases further, the deadweight loss increases even further and it goes on. So, in this case, we are not observing any maximization of the deadweight loss or any point of minimization; but it is just that as the tax increases, the deadweight losses also increase. But this is an important question for the government. Because earlier when the government was looking at the Laffer's curve.

Then probably this much was the optimum size of the tax. But if we look at this curve at this optimum, the deadweight losses are already too high. So, in this case, with the optimum that is given by the Laffer's curve, the deadweight losses are already too high. So, now, the government will have to think again. The government will say that 'ok, I need this tax revenue to work for the people, but in the process of maximizing the tax revenue, I have already hurted people.

Because I have already reduced their surplus by a very large amount as is given by the deadweight losses. So, this is another consideration that the government should keep in mind, while designing the tax system, that we cannot have a tax system that works only on the maximization of tax revenue.

We will also have to look at what is the amount of acceptable deadweight losses. Now, this term acceptable dead weight losses, it would depend on the country, it would depend on the culture in that country, it would also depend on the level of development in that country and also, on special considerations such as wars. Now, in the time of a war, the government may increase this amount of T probably towards the maximization of the Laffer's curve.

The government will try to maximize the tax revenue to use for war purposes. Because in that case even when the deadweight losses are large, people probably will not mind. But in a normal circumstance, if the government tries to go for a tax maximization. So, people might just revolt against the government. So, this is an important consideration to keep in mind, while designing the tax system. But then, this again is not the only consideration.

We have seen that the taxes reduce the total surplus, introduce deadweight losses and the quantum of the deadweight losses depends on the elasticity of demand and supply. So, essentially if we have a very elastic demand and supply, then in that case the deadweight losses will be even greater and the deadweight losses increase with the tax, but government revenues increase and then decrease as in the case of the Laffer's curve. So, the government has now 2 variables to work on: one is the size of T so that it can maximize the tax revenue, while keeping deadweight losses to an acceptable value; but then, once the government has decided that ok this should be the size of T, the next question is when should the government charge it from and also, if there are any other implications.

Implications such as the administrative burden on people. Taxes increase the administrative burden for people, who are filing their returns. Because in the case of a tax system what the government does is that the government decides that people have to pay this much amount of tax, this is the tax size. But then in a number of cases the government asked the people to do this computation by themselves. So, a very similar situation to what we have in our country.

At the end of the financial year, what we do is that we make a return of the amount of earnings that we had in the financial year and we compute the amount of taxes that should be given to the government. And that amount of tax should be given to the government. Now, the thing is for a very large majority of people, finding their returns, doing these computations can become a burdensome activity. Because it requires time, time that could in effect have been used for certain other productive purposes.

When the government insists on having a tax even if the size of T is very small, then it would entail people to spend their time in filling out their returns and this time is an unproductive time for a large majority of people. So, one consideration is that taxes increase the administrative burden for people.

One alternative when the government is designing the tax system is a return-free-filing. Now, what is a return-free-filing? In certain countries what happens is that when you do any transaction, so when the one when your employer is paying you a salary, this salary is given in the form of an electronic payment and when the employee is making this transaction, a copy of this transaction gets to the government and the taxes gets deducted at the source.

When you make any payments, say for the education of children or say committing a medical need for which there is an exemption in the tax code, whenever any such payment is made, then that payment is also made electronically and the information automatically gets to the government.

At the end of the year, what happens is that the government just sends a piece of paper probably electronically which gives a record of what sort of money you received and what sorts of payments you made and if those payments get into any of the exemptions, they are automatically exempt from the taxes. There is a computation of the taxes done, a deduction of all different kinds of taxes and then, you get the final value.

You only have to check this document once to ensure that there is nothing that is unacceptable. So, probably there is no deduction that should have been made, but the government failed to make it. But essentially the administration gradually gets reduced to quite an extent.

Because the government has given you all the records that it has about your earnings and about your expenses. The government has done all the calculations and you just have to pay that amount of tax; probably that too electronically. Now, in that case, we call it a return-free-file. So, people do not have to file a return at the end of the year. In most cases, people just pay the amount that is shown on their statement and that amount gets paid and that is the end of the story.

Very similar to what we do in the case of credit cards. So, at the end of the month, the bank sends a statement about what sorts of spending it has observed on the card and how much interest needs to be paid. If everything is fine, you just pay that amount. What if the bank asks you to keep a note of all the transactions that you are doing and then, pay them an interest on that transaction. That would have become an extremely difficult task for most people and similar is the case of taxes.

So, filing of the taxes creates an administrative burden which increases the inefficiency in the society because that time, that effort could have been used for certain productive purposes. So, when the government is designing a tax system, one option that is there with the government is return-free-filing that would increase the efficiency of the whole process. Another consideration is complications in the tax code. Now, what is that? The government when it is collecting taxes, it makes a tax code.

The tax code would provide a list of different things that the government is promoting or say not promoting. So, it is possible that the government says that if you provide a donation to a charitable institution, you will get an exemption from the tax. Now, why would the government do that? Because the government wants to promote donations to these charitable organizations. Now, this is a way we have seen in the case of the principles of economics that incentives can make people do certain things.

And so, a deduction from the taxes can be used and is used by the government as an incentive to promote certain activities.. Now, what happens is that over time, the government goes on making additions and subtractions to the tax code and with time, it becomes extremely complicated.

So, you do not know which all activities are going to get an exemption, which all activities will not get an exemption in the current revision of the tax code. So, probably something for which you were getting a deduction last year has been removed from this year's tax code or probably, something that you were not making a deduction on last year has been added. Now, whenever we have such a situation, when people are filing their tax returns, then they have to go through the current provisions that are there in the tax code. It again increases administrative burden; it again increases gratuity; it again increases inefficiency. Because this time that everybody is spending on reading the tax code and finding out how they can save on their taxes could have been spent on say much productive uses. So, this is another consideration, how complex or complicated or simple should the tax code be.

Now, if the government goes for a simplification of the tax code, so in that case, we will have a situation in which the administrative burden will be reduced. People will know very easily that ok, these are say 4 or 5 activities that we can get exemption on and nothing more, nothing less.

But in that case, the government will not have that fine a control over the kinds of activities that it wants to incentivize or disincentivize. Because after all these provisions were only made so that the government could incentivize or disincentivize certain activities. So, if the government goes for a finer control, it would increase complexity;

If the government reduces its control, it would make the tax code simpler. But in that case, it might reduce the spending on those activities that the government was finding necessary for society. Now, what it means is that the government was putting these complications because of the economic principle that governments can sometimes improve upon the market outcomes. So, this is one way of improving the market outcome.

But if the government goes for a simplification, then probably the government will be shifting from its duty to improve the market outcomes in the best possible manner. It will be giving out its power. That is another consideration while designing the taxes. Another is that exceptions in the tax law may permit very low taxes.

What happens in a number of cases is that there are people, who are experts in finding out the exceptions, finding out the loopholes and in the case of certain people, they may do their spendings or they may do an asset allocation in such a manner that overall, they have to pay a very less tax.

While everybody on an average is paying say 20 percent tax, there could be certain people who are paying only 3 or 4 percent of their income as taxes because they are making use of all the loopholes that are there. Now, these loopholes were again put into the tax code because the government was trying to promote certain activities.

But then, if this promotion of certain activities through this incentive of a tax break is extended to such an to such a level that it becomes a loophole, then that would again become counterproductive. So, here again the government has to look at how much is the amount of control, how much is the amount of exceptions that it wants to put in.

Now, exceptions are helpful to a large number of people for 2 things; one it reduces the amount of tax burden that they have to pay and two, by using these exceptions, the government channels their money into those activities that can help the society. Now, if these exceptions are removed, then probably these benefits will also be triggered.

So, this is another consideration. Another consideration is whether to choose for efficiency or for equity. Lump-sum taxes are the most efficient, while progressive taxes are the most equitable. Now, what is a lump-sum tax? A lump-sum tax is a tax that is the same amount for every person, which means that if the government says that from this year onwards, every person will have to pay 1000 rupees as tax. So, that is a lump sum tax.

It has got nothing to do with whether you are rich or whether you are poor or whether you are a soldier or whether you are businessman, it has got nothing to do with anything; whether you are an old person, whether you are a young person, nothing good. It is a lump-sum tax. If you are a citizen of this country, then every year, you will pay 1000 rupees as tax. Now, a lump-sum tax in certain cases is very efficient because everybody knows from the beginning of the year that ok, I will have to pay 1000 rupees as tax.

The rest of the money that they have that can be put into a use that will provide them the largest amount of returns. It simplifies everything; it simplifies the administrative burden and regally because everybody knows that they just have to pay 1000 rupees and the rest of the money will probably be used for such productive purposes as good help the society as well because it would be increasing the surplus in the society. But then, if we go for a lump-sum tax.

Then there will be there will be certain people who would say that ok in this tax code, a poor person is being forced to pay the same amount as is a rich person or probably, somebody would say that a person who is very old, he or she also has to pay the tax at the same rate as a young person is paying; whereas, the old people have a large amount of medical requirements, they cannot work that hard. So, this is a tax that is discriminatory.

It is putting a negative burden on the old people; it is putting a negative burden on the poor people. So, now, this again becomes a consideration. The lump-sum tax was good because it was reducing the treasury of everybody; but then, in the process of reducing the treasury of everybody, it might increase the amount of tax that needs to be paid by a certain specific set of people, who probably need more help from the government. So, that is because they are in a lesser position to pay the taxes. So, this is a lump-sum tax.

So, a lump-sum tax is the most efficient. Another kind of tax is a progressive tax. Progressive tax is a tax for which higher income taxpayers pay a larger fraction of their income than do low-income taxpayers. In our country, we have a progressive tax system. The more you earn, the more you pay. This is the progressive tax system.

It ensures that poor people who have less earnings will also have to pay less taxes; old people who are not working because of their old age or because of certain health conditions or because they have retired. So, those people also will have to pay less taxes. That is a progressive tax.

Now, a progressive tax is very equitable because it shares the burden in such a manner that people do not feel a very large amount of pinch. In the lump-sum tax, the poor people or the old people would be feeling a very great amount of pinch because they have to pay the tax at the same rate as the other people are paying.

But in the case of a progressive tax, it is much more equitable. So, this is another consideration that the government has to keep in mind; whether it wants to go for a lump-sum tax or a progressive tax because here again, we have pros and cons of each of them.

Another consideration is regarding who should pay and here, we have got two principles. The first one is called the benefits principle. The idea that people should pay taxes based on the benefits they receive from government services. What we are saying in the case of benefits principle is that the benefits principle says that the taxes that you pay is just a form of spending that you do for getting certain services. So, the government provides services such as protection.

Now, a person who is rich, probably has a large amount of assets. So, this person would require a greater amount of police protection than say a person who does not have a very large amount of assets. Because if there is a theft, then probably a thief would want to perform theft in the house of a rich person.

So, because of the presence of the police, the rich person is benefited more than the poor person. Now, if the rich person is getting more of the services in the form of the police services, protection services; then, the rich person should also pay a greater amount of share in the form of taxes. So, this is what the benefits principle says. The idea that people should pay taxes based on the benefits that they receive from the government services.

Rich need more police protection, so they should pay more for the police protection. Roads should be built and maintained by taxes on petrol and diesel because the people who are using the vehicles, the people who are using petrol and diesel, they are the people who are going to be using the roads.

So, they should be paying for the building and for the maintenance for the upkeep of the roads. Now, this is the benefits principle and it changes the work of the government to that of a private provider of services. So, probably, if we shifted to a benefits principle, then there could be say a private person who provides protection services. So, this person employs a number of security guards and he or she provides protection services - security services to rich households.

Now, in that case, the benefits principle would say that ok now these rich people do not need police protection because they have had a private security service. In this case, now they should be repaying less for the less in the form of taxes. Similarly, when we talk about the roads and their building and upkeep being done by taxes on petrol and diesel, then probably there could be a private contractor who builds his own roads.

And in that case, he is going to charge the people for these roads. Now people should have the option whether to pay the government or whether to pay the private contractor. Now, this is what the benefits principle would say. But what about those services that everybody is using, things such as clean air, clean water that are all the benefits of conservation. If you get a thrill of seeing a tiger, then that thrill is something that you will only get when the tigers are there.

Now, probably you can say that no I want to save my money and so, I am not going to go see a tiger. So, why should I pay for the conservation of tigers? But then, if everybody starts to think like that, then probably in a short period of time without any protection; all the tigers get post upon and once that happens, it is possible that your next generation or their next generation that is your children and grandchildren, they want to see a tiger; but then there is no longer any tiger left.

So, the benefits principle, it may help in certain cases, but in a large number of cases and especially for questions of conservation benefits principle might not apply. Because how are you going to charge everybody for safe clean air; how do you figure out who is using how much of the clean air and how much of dirty air or who is using how much benefit of biodiversity and who is using less amount of biodiversity. So, these are questions that are extremely complicated to answer.

So, the benefits principle might be used in certain cases in a tax system; but for a large number of cases, it just does not apply. Another principle is the ability to pay principle, it is the idea that taxes should be labeled on a person according to how well that person can shoulder the burden.

That is, does the person have the ability to pay and the greater is the ability of a person to pay, the more should be the tax. Which means that there should be an equitable taxation system. An equitable tax system can be described in terms of the vertical equity and the horizontal equity. Vertical equity is "the idea that taxpayers with a greater ability to pay taxes should pay the larger amounts", which can take the form of proportional tax, regressive tax or progressive tax.

In the case of vertical equity, we are saying that people who have a larger ability to pay taxes should be paying the more taxes and people with a lesser ability to pay taxes should be paying lesser amounts of taxes. Now, this can take the form of a proportional tax. Proportional tax is a tax for which high income and low income taxpayers pay the same fraction of income, which means that if we have a tax system that is a proportional tax system, then in the tax code.

We will say that ok everybody has to pay a 5 percent tax or say a 10 percent tax. Now, in the case of a 10 percent tax, a rich person will also be paying 10 percent of his or her income in the form of taxes and a poor person will also be paying only 10 percent of his or her income in the form of taxes.

In this case, the taxation is proportional. Because everybody has to pay the same proportion of their income in the form of taxes; but then, it is an equitable system because the rich person who is earning more will also be paying more because that 10 percent is now a very large amount.

What we are saying here is that a person who is earning say rupees 10 crores will be paying 10 percent which is equal to rupees 1 crore and a person who is earning rupees 10 thousand, here again this person will only be paying 10 percent. And in this case, the 10 percent is rupees 1000. This is an equitable tax because we are asking both the rich and the poor to pay only 10 percent. But by asking them to pay 10 percent, we are taking a larger sum from those people with a greater ability to pay and we are taking a smaller amount from those people who have a lesser ability to pay.

So, even though, in this case the taxation is proportional to the income, it is having a vertical equity because we are taking a larger amount from people with a greater ability to pay and a smaller amount from people with a lesser ability to pay. So, this is a proportional tax. Another tax is a regressive tax, a tax for which high-income taxpayers pay a smaller fraction of their income than do low-income taxpayers because when the income is more, there is in total more tax even when the fraction is small.

In the case of a regressive tax, what we are saying is that the poor people will have to pay 10 percent, but the rich person will have to pay only 1 percent. Now, in the case of the rich person, this 1 percent is 10 lakhs of rupees; rupees 10 lakhs. Now, this regressive system would say that this is still an equitable system because the person with a greater ability to pay, a person who is earning 10 crores of rupees is still paying a very large amount.

He is paying 10 lakhs of rupees and a person with a lesser ability to pay, who is earning 10 thousand rupees is paying 1000 rupees. Here again, we are taking a larger amount from those people with a greater ability to pay and a smaller amount from those people with a lesser ability to pay. People would say that yes, this again is an equitable system because you are taking a larger amount from people who have a larger capacity to pay.

But then, this is a regressive tax system because the richer a person is, the smaller fraction of his or her income needs to be paid as taxes. So, which is why we say that this is a regressive; the higher you go in the income ladder, the lesser proportion of your income you have to pay as taxes. But here again, it is an equitable tax. And the third tax is known as progressive tax, a tax for which higher-income taxpayers pay a larger fraction of their income than do lower-income taxpayers.

What we are saying here is that in the case of these people, who are earning 10 crores; now in the case of a progressive tax, we are saying that the higher one goes in the income ladder, the more is the taxation. Which means that the poor person will have to pay 1 percent and the richer person will have to pay 10 percent. So, 10 percent of 10 crores is 1 crore and 1 percent of 10 thousand is 100 rupees. Now, in this case this again is an equitable tax.

It has vertical liquidity because a person with a lesser cap capacity to pay is paying a lesser amount and a person with a greater ability to pay is paying a larger amount. So, here again, it is equitable; but it is progressive because the more you earn, the larger fraction of your income. That is if you are earning less, you are paying 1 percent; if you are earning more, you are earning a larger amount, a larger fraction 10 percent. So, the more you earn, the greater fraction of your income needs to be paid as taxes.

Now, we can have all these different kinds of vertical equities, these different forms of taxation; proportional, regressive or progressive that can lead to vertical equity. But again, which of these is going to be used in a society will depend on that particular society.

Because in the case of a progressive tax, there are certain people who would say that - 'yes progressive tax is good; it is great because the poor people have to pay a lesser fraction of their income, the rich people have to pay a larger share of their income'.

But somebody else would say that - 'ok, so if I work harder, if I earn more, I will have to pay a larger portion of my income to the government which means that I will be left with an even smaller fraction. So, is the government not disincentivizing people to work'. Because again, people respond to incentives and if you tax the rich people with a greater fraction of their income, are you not disincentivizing them to be rich? So, do you want to convert the country into a bunch of poor people?

No, these are questions that are not just economics questions, these are philosophical questions. So, this is vertical equity. Another equity is horizontal equity. The idea that taxpayers with similar abilities to pay taxes should pay the same amount. Now, in the case of vertical equity, we were saying greater ability to pay taxes and in this case, in the case of horizontal equity, we are saying people with similar abilities to pay taxes should pay the same amount.

When we talk about verticals, we are talking about differences. So, when we say vertical, we are saying that this person needs to pay a different amount from this person. In the case of horizontal equity, we are saying that if 2 people are at the same level, then they should be paying the same amount of money as taxes.

And in this case, we are saying similar ability to pay; but then, the question is what is a similar ability to pay. If there are 2 families and each family is earning 10 lakhs of rupees and one has 2 children, the second has 10 children. Now, should they pay the same tax? Because in the case of a family with just 2 children, they probably have to spend less on having just 2 children. The expenses on food, the expenses on education, the expenses on clothing will be lesser because there are only 2 children.

On the other hand, the second family that is having 10 children will have to spend more on education, more on food, more on clothing, more on everything. So, these are 2 families that are each earning 10 lakhs of rupees; but do they have the same ability to pay or should we say that the family that has 2 children has a greater ability to pay because their expenses are less and the family with 10 children has a lesser ability to pay because they have more children and so more expenses.

But if we make that distinction and if we say that the family with 10 children will have to pay less taxes, are we not incentivizing families to have more children, when we are already suffering from overpopulation. So, that is the question: should they pay the same tax?

And if we allow tax breaks to the second family, are we promoting large family norms? So, this is another consideration that the government needs to keep in mind. Another consideration is should we aim at average taxes or marginal taxes. Now, average tax is total taxes paid divided by the total income.

Which means that if you are earning 100 rupees and you are paying 10 rupees; then, your average tax is 10 percent. Marginal taxes on the other hand is the amount by which taxes increase from an additional unit of income, which means that the marginal tax is asking the question that if I am earning 100 rupees, I am paying 10 rupees; if I earn the next 100, will I have to pay 10 rupees on the next 100 or do I have to pay 20 rupees for earning the next 100?

That is the amount of tax that I need to pay for the additional income that I am making. So, if I earn 101 rupees, how much amount of tax do I need to pay on this 1 rupee? Now, if we say that people who are earning less will have to pay less and the more they are earning, the higher will be the tax bracket; that is if the marginal taxes are high, then are we seeing as a society that people should not work hard, they should not earn more.

This again is a consideration. Should the government aim for average taxes or marginal taxes in the tax scheme? Similarly, should we have a tax on income or a tax on consumption? A tax on income discourages people from saving; whereas, a tax on consumption promotes people to save. Why? Because if there is a tax on consumption, it would mean that the more you spend, the more you will have to pay. So, whatever you are earning, you can keep with yourself; but the more you will spend, the more you will have to pay the tax, which means that the government is saying that everybody should try to save as much as possible. Because the more you save, the less you will have to spend. On the other hand, in the case of an income tax, the more you earn, the more you have to pay the taxes.

So, a tax on spending will promote people to have the habit of saving. So, that will increase the amount of savings that we will have as a nation in total; but here again, the question is can we shift from an income tax to the consumption tax because it may be complicated or should we just say that because for so many years, we have been having income tax. So, let us just stay with the income tax. So, these are all different kinds of questions.

And a large number of these questions are not just questions of economics, but also philosophical questions. Because you need to make a choice between efficiency and equity. And as we saw before, economics is the science of decision making; economics is the science of choosing between options.

You cannot have all of everything, you will have to choose between a lot of things; you can choose between efficiency or you can choose to have more equity. This is a choice that needs to be made and which makes the design of the tax system at times complicated.

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