

Towards an Ethical Digital Society: From Theory to Practice
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Lecture - 09
Keynote - Technology and Ethics: An Economist's Ruminations

Because we are teachers and we lecture a lot but a keynote address that is greatness. Is technology and ethics, an economist's ruminations. So I will talk in two parts. First, I will explain what I mean by these terms, and then elaborate on it a little bit. The third part would be the more interesting one where I think you can ask questions, and we can have a discussion around the kind of things that I say.

And that really should be the part that is most interesting. Now I am not an engineer. I do not even know science. I do not know what e equals mc square means. So how dare I talk about technology? Now this is a question I think should be answered. And I answer it in my own way. And I say that science for example is the study of natural phenomena.

And the concerns in science is to understand how nature works and how the stars move and oceans move and all that kind of stuff. And try to find out underlying laws which try to explain their behavior. And you do this through the application of observation, logic, experiment. Now that is the major concern of science. And that is something I do not know anything about. What is engineering then?

I think the knowledge that you gain from science is applied to problems of production, to problem solving. Whereas a physicist is interested in how stars move and so on. Engineer is concerned about how to send a rocket to the moon. So there is a practical problem solving orientation. They all study the same kind of subjects, but there is a greater urgency towards doing something with the engineer than there is with scientist.

So it is a it is really a difference in approach. In today's world the engineer is more job oriented. Okay, that is fine. But then what is technology? And this is where I come into the picture because I say that the engineer is interested in solving problems. Very true. But all engineering feats are not necessarily technology.

I mean, ISRO did a great job in sending Mangalyaan by Mars. A lot of fancy science and engineering involved in science in terms of the calculation and understanding and engineering in terms of the materials and making the rocket fuel and putting them all together. I think that is clear. But the point I am making is that this is an engineering feat, but it is not technology, because not available to the masses.

Engineering knowledge becomes technology when it becomes available in the market to people. So the rocket to Mangalyaan is not technology. But Boeing and Airbus have planes that are technology. So there is a certain market orientation, or response to market requirements that converts engineering feats into technological achievements. There is an economist called Mariana Mazzucato, who has studied Apple in great detail.

Now Apple is known as a high tech company. And she finds that it is really a design company, at the end of the study. Says all the engineering that goes into Apple products, the touchscreen, the Wi Fi, whatever. I do not know I am not an engineer. I do not even know what goes into the iPhone. There are lots of things that go into the iPhone. And all these were funded by the US government through various programs, largely related to defense.

Apple's achievement lies in the fact that you take all these different things and put them in that little box, you call an iPhone. You design it to look nice and price it in a way that lots of people will buy. So Apple's contribution is taking no technology, but putting it in a usable form, in response to market signals, technology. So it is in this sense that I am talking about technology and what follows.

I am not talking about scientific achievements or engineering feats, talking about is that reach the market. I see you had large dose of ethics in the last two days, simply put in study of what is right and what is wrong. We have a long tradition here we call it dharma. There are kinds of dharmas. One of the things about dharma is that it is not unique.

There is this whole smriti called the Mahabharata in which case, the same similar situation for two individuals need two different behaviors, both of which are dharmic in their own right. You do not condemn. In fact, a very well-known business manager called Gurcharan Das, based on the Mahabharata, in the context of corporates. He has an interesting book called, The difficulty of being good.

It shows you that that is because what is good is a very difficult thing to do. An example for example, is currently I ran away from Delhi because of the pollution, it is highly polluted. It is bad for everybody. But it is also business opportunity for this industry making air purifiers. Now if the government did its job, and we were citizens who are serious, there would be no air pollution. It is a public bad.

It is a public bad, but it is a bad for which if you have the money, you can find a solution. You can put an air purifier, and when you sleep at night, you can have clean air in your bedroom. Now there is a bit of an ethical dilemma here. I mean, you are basically making money out of a thing that gives people relief from a public bad, in which those who can afford it get relief and the others do not.

And this is not a very uncommon thing. There is an Indian group, which is known as being ethical and moral, the Tatas. Now very many years ago, the Indian government had a policy of subsidizing diesel, compared to petrol. You are probably all aware of this. And the reason given was that diesel is used in trucks, which are used to move food grains and fertilizers and so on that are very important for the poor.

And from the point of your prices being low for the poor, it is necessary to keep the price of an important input like diesel down, and therefore diesel was subsidized. But there was a business opportunity here, diesel was cheap. And the Tatas got into the act and brought in diesel cars, which are more polluting than other cars. It is a business opportunity. And it is the dharma of business to make profits.

But you can also argue that taking advantage of a subsidy that is meant for the poor to sell diesel cars to the not so poor, is not necessarily a good thing. So there are lots of dilemmas here. There is no simple answer. There is no necessarily right answer. I

might make a choice that is right, from my point of view and you will have a right to question it from your point of view.

And I really do not know how that is solved, you need a Mahabharata to solve it. Okay, so I have tried to lay the groundwork for the two terms that I am going to be working with. Where do economists come into this? I do not know if any of you are economists here. But if not Economics studies, human beings in the course of ordinary life, in how do people make a living? That is really the core area of economics.

And how do you make a living? You make a living doing something, you get a job, you do something, you produce something. And for that you earn something that what you earn you use to meet your needs. And your needs are somebody else's business opportunity. We are all producers and we are all consumers. As a society we produce and as a society we consume.

So this business of production, consumption and the relationship between them, this is really the heart of economics. And into that, how does this buying and selling takes place? It takes place in the market. To the economist, the market is not a place it is a space where buyers and sellers meet. And when do you come to an agreement? When you agree on a price.

Now that price has to be one where if I am a producer, it has to meet my costs of production plus give me some profit. Because unless there is a profit, why should I do all this? And I need that profit for my own consumption. And I will buy it at any given price if I feel that it is going to be fair, that the quality of the good I get meets my particular requirements, and I cannot get it cheaper anywhere else.

So the market requires not only a single buyer and single seller, it requires multiple buyers, multiple sellers. And it is this process that ensures that a price is arrived at. Because unless there are multiple producers, multiple sellers, you can jack up the price to anything that you want. It is only when you say that look, oh, I do not like a Maruti car, there is a Tata car or Hyundai.

And that particular process of having a choice that puts a pressure on the producer to limit profits. From the consumer side, I look for what I get cheaper, given quality. So these are the two things. So in a sense, that is basically the kind of situation we find in. Now going a little more deeply into how have economists gone about their business? And this is where I come into the ruminations part of it.

Ruminations is what you do when you have been around for a long time, made your mistakes. And you are looking back and seeing why is it I made that mistake and not some other. So it is a considered look at what one has done and the symptoms that led to one's distress or whatever it is. So looking at it from this particular point of view, when you look back on economics, there has been an undue emphasis on one particular kind of economics.

There has been an undue emphasis on the kind of economics that believes man and here economic sense will be gender, whatever the wrong side of it, man, including woman or whatever, people are rational. Now psychologists will not have much quarrel with this statement that people behave rationally. But the economist goes a step further and says rational is rationality is measured by money.

So I do whatever I can. And if I am rational, I maximize my monetary return from that particular activity. This particular school is called rational expectations. It is largely rooted in the University of Chicago. And this is a key assumption in lot of what happens. Yes, people say that there are some exceptions.

Now if I go by the strict definition of rationality, then it would be irrational of me to pay school fees for my children, because I do not get a direct benefit, the children do. So yes, you accept that while we assume people are rational, some of them are stupid enough to pay their children's education. But with that little caveat, they proceed with the analysis with the thinking.

The second key assumption is not only that people behave rationally, that people function as individuals. This goes back to the history of political science with the freedom of the individual, human people rights. There is a whole literature,

philosophical, political along that line. And therefore, not only am I rational, I am writing as an individual in society, and maximizing my individual gains.

So this is the second part of it. They are not looking the way for example, we in India do, where you are an individual yes, but you are a part of a family, you are part of a caste, you are part of society, a part of a linguistic group. We have very little identity as solely an individual. We are defined by other things.

And in a lot of our behavior, and particularly social ones, marriage this that and the other, many of us may have individual differences, but we go along because, you know we are individuals that are part of a society and the society expects things of us. I would not drag it to an extreme but this is necessary to say this because an individual as part of a community is one thing, an individual qua individual is something else.

And if the individual qua individual who is a maximizer. A third assumption and this is also brought into economics. It has its own philosophical basis. Not only do people behave rationally as individuals, but they live in a society that considers private property as the fundamental rights. The right to property.

That is the right not just to the use of a particular resource or the right to inherit it, to bequeath it, to sell it, to lease it, all rights that can go with any particular resource are a fundamental right of people. Now this has always this has never been because whenever you look at, you talk of England. In England a lot of properties what they call crown property, it is not even the Queen's property, the word used is crown property.

It belongs to that abstract thing called the crown which represents the people. If you look at the Indian tradition, land for example, which was the major source of wealth in an agricultural society was seen as belonging to the Raja. But because belonging to the Raja in that he had rights to allot it to a tiller or not. But he also had to protect it against invasion from somebody else.

But it was not personal property of the Raja. So where is the distinction between use of rights, rights to use and absolute right where you cannot raise any question on property. And it is this concept of absolute property. And this is a very essential thing, because if for example, I talked about pollution, why is there a pollution?

If I can buy an air purifier and solve my problem, why should I continue telling things to solving the larger problem, to which I may be only a very small participant. The pollution I can take is everybody behaves this way you have garbage mountain. Those of you who have been in Delhi and taken the Chandigarh Highway will see that huge mountain of garbage.

I once thought it was a table mountain of Cape Town. It is not table mountain, it is garbage. Garrett Hardin wrote a famous paper called the tragedy of the commons, because the individual interest by following a maximization strategy, you might maximize your interest, but in the long run, the resource gets degraded. Now this is something that happens when you talk of totally individual rights. When you have different systems where there is no absolute ownership of property.

And a lot of the research of Elinor Ostrom, for example, and she is a Nobel laureate in economics, has to do with other forms of society in which decisions are not based on individual maximization. Now one other thing, which is never stated, but which is an essential part of this kind of thinking, is that when you are talking of profit maximization, you are talking about the short run.

You look at corporate behavior nowadays and if you follow the newspapers and so on. Individual maximization is using the term shareholder value. I own a share in some company, the returns I get should be maximized, which is interesting in itself, because the company is not just owners of the company, but also workers, managers, customers, all of them are part of company ecosystem.

But the company is to be run to maximize shareholder value. So that is the way this thing is presented. And how a shareholder value measured in the immediate short run? So if you look every three months, you get companies that meet and say quarterly

results. So what are the profits I made in the last three months and what is the dividends I get and so on.

But one of the problems of this is, again the problem of the common, is company behaves to maximize its return next three month. It may do things that compromise its long run existence. You may not invest enough in trying to get returns in the short run. You have to think, but then there is a famous remark by Keynes, in the long run we are all dead. So why should we? I will be dead, my kids well, it is their headache.

So this is part of the overall issue in which one school of economics looks at it. I have spent so much time on this because this is the dominant school. This is the economics that we are taught. This is the economics that we teach in our turn. And the implication of this is that if you have problems in society it is because the market is not functioning properly. And what is the conclusion that would follow from that?

Do whatever it takes to make the market function properly. And there are times it works and let me not say it does not work. One of the unregulated sectors in India that was in chaos was the stock market. But after the government got into it and began to set up SEBI and began to put in rules of the game, the Indian stock market is among the best regulated. That does not mean there are no scams.

That does not mean there are no frauds. They are there. But there is a need for some kind of regulation you know with which it works. So there is always in modern economics, this question of do I do something to maximize profits for next quarter, next year? Or do I think in long run terms? And one of the conclusions that has come out of this, for example, is the way mainstream economists insists that free trade is an absolute good. That is maximizer.

Yes, there are conditions under which I can show that if you have free trade between say two countries, and the prices are different in both, then I can show very, very clearly that both countries will benefit if they trade compared to a situation where there is no trade. You can even show (()) (21:09) which says that some trade is better than no trade. This can be done and then they you can prove these things mathematically.

There is no issue on it. So the point is, what is the time horizon? It is with my resources today, my products today, we have a trade and we maximize. Now when we became independent for example, this was the dominant theme, but we did not buy it. And the argument then made, which economists today call the infant industry argument that we were a developing country, we are emerging out of colonialism.

We have to develop our own industries. And if we go by the current cost-benefit analysis, we will never develop our industry. So forget again, the short run logic and take a longer strategic view and you will succeed. If you look at the 1960s for example, India had a GDP greater than China, Korea, most of these countries. What did India do? We said, no, we are going to have public sector, we are going to build our steel.

And we are going to build machine tools and electronics and whatever. We built up the public sector industry. And today we have an industrial base. By the tenets of mainstream economics, that was an irrational thing to do. Because the returns from this would come 15, 20 years down the line. And during those times, you know you were not maximizing.

So the question of time horizon is something that is important. So this country, although largely mainstream economics oriented, also took decisions, you can say they came in from the political side or whatever. If they were decision, then I think correct decision when I look back. A good example is Korea. They had very little experience of either.

But today, the cheapest thing in the world is Korean steel and add to that electronics. They are smart than others. They have chosen to split it up, took 10 or 20 years of losses. And then emerged with world class industries and products we can sell anywhere. So when you look at historical experience they said, do not go with that kind of economics. Because it is not dealing with a problem that you have.

It is dealing with something else. So this is something that is absolutely necessary. In understanding this you take a long term view. And there are schools of economics that

do that. There is an institutional school which talks of the importance of institutions and a society development. I mentioned SEBI, SEBI is an institution.

By an institution you mean a code of behavior by which something is, it is not necessarily a building. The institution of Parliament. In a democracy you need a Parliament because one and a half billion of us cannot affect policy. We elect Members of Parliament who make laws on our behalf. But if they do not have the freedom to debate then we do not get good laws. So that is an institution and there are so many other institutions, which interact to form a modern society.

Now one way, no let me first talk of the school. One reason why this kind of maximization does not take place, as predicted by mainstream theory is also because the assumption made which is not openly stated but which is necessary for the mathematical proof to work is that all consumers are equal, all producers are equal. And they have equal access to information, equal access to finance.

And the fact of the matter is that in all societies, and certainly in ours, there is a great deal of inequality. If you look at our one and a half billion people there are very large number of them, who do not have enough income to buy the food they need. We have others who have so much money that they can have lavish weddings spending hundreds of crores. Both are true.

I am not making a moral statement, I am just stating it is the fact. And when you have such inequality in society, a policy that is based on the assumption that all are equal will only lead to a situation where the inequality increases. There is a biblical saying, to him that hath shall be given. And from him that has not shall be taken back if he has. I am quoting the Bible out of context; that is a different context.

But that applies certainly to the way the economy functions. If you look at what has been happening in India, we had low rates of growth after independence but there was much greater, much less inequality, not greater much less inequality. But from 1980 onwards, when the rate of growth has gone up, like today we talk of four and half percent as unacceptably low.

Whereas in the 70s, and 80s you know 2.5 was considered very good, jokingly called the Hindu rate of growth. So there has been a shift. But in these particular years, inequality has increased phenomenally. Now this has been shown by our latest Nobel Prize winner Abhijit Banerjee in a study he did in 2000. Well, what he did was he looked at data from the income tax department.

The income tax department was set up in 1922. Now only those who have income pay taxes. Now if you are not in the list of the income tax department, you are not in the rich list. Some have black money, you can put it aside. But by and large, only those with income, pay taxes. And the system of taxation is progressive. In other words, the higher your income, the larger the proportion that you pay in tax, progressive taxation.

So that is the way it goes. So you know if you are just about making 5 lakhs or over 5 lakhs, you pay a very small amount. You are making a couple of crores you pay a larger amount. Not in percentage. In percentage terms larger amount, proportionately larger. It is clear, is it not?

So if you look at income tax return, and try to do an analysis, then over time, it should tell you whether the larger people are paying more tax or not. Now what Abhijit Banerjee, he worked with Thomas Piketty who is yet to get the Nobel Prize, they found that from 1922, to about the 40s, that is the time of turbulence with the war and so on, there was increasing inequality.

In other words, those who are paying lower levels of taxes, were paying proportionately more than those who are higher, although they are supposed to pay less. That is the meaning of inequality. But somewhere along the line from say, 1950 to 1980 inequality lessen. Then from 1980 to about 1995 it stayed the same, there was a drop. But from over 95 onwards, inequality increased to the levels of 1922.

So this was and the question that was being asked is they were following a new policy, the new economic policy. There will be growth, so that growth leading to lower or higher inequality. And they suggested it was leading to higher inequality. There was a bit of a furore about it. But the most interesting reaction is that of the

Government of India, which from 2000 onwards stopped publishing the income tax statistics.

So if you ask me today what happened between 2000 and 2018 or so I do not know. There is no data anymore, it has disappeared. And I cannot get it under the right to information because the right to information will only give me data that is available. And this data is not available in the sense that it is in lakhs of tax returns that are filed, nobody has compiled it. So under the right they said we do not have the information, we cannot give it.

We do not collect, do not process information. So this question of inequality becomes an absolutely critical one for countries like us. Because inequality at the lower end basically means survive. If you look at the lower end in this country, you are talking about starvation index. You are talking about child malnutrition. You are talking about a lack of education. You are talking about poor access to healthcare.

Maternal mortality is ridiculously high in the country as a whole. In Kerala, it is up to the same level as Portugal, which means it is reasonable. But then you go up to MP, UP, Rajasthan it goes to ridiculously high levels, lack of access to healthcare. You can refine it further, but I would not do that, I will just leave it.

So we have parts of the country where things are sort of good, parts where they are totally unacceptable. But Kerala is also not necessarily the richest part of the country. The growth rate in Kerala has not been very high for the last 20, 25 years. Growth rate in Gujarat has been very much high over the days. These cities are not good in Gujarat. And if you take India as an average, we still have unacceptable levels of poverty.

Now poverty that we have is measured in a strange way. Our Constitution guarantees education up to the age of 14, access to healthcare, etc. So when economists first set out to measure poverty, they said what is this that the state is not providing? It is providing schools, it is providing, so basically it is food. So if your total expenditure in a given period of time was less than what it costs to get a certain basket of nutrition.

They use the WHO norms for capita per day. So in order to get that nutrition, what food you need to buy, what are the current prices. And in order to get 2200 kilocalories per person per day, on an average how much should you spend? When this was done in 71, that was 20 rupees a month. For 20 rupees you could buy that much. No sorry, yes 20 rupees. You could buy enough.

Now this meant that you could keep body and soul together. It does not mean that you are healthy. It just means you did not die. And that is our measure. Because if your total expenditure was above that, you are not poor. So you must remember that when we talk of percentages below the poverty line, we are talking of this. We are not talking about people who are unable to pay school fees or rent, but who may be able to eat.

Now if this is it, what was the state of poverty at the time of independence? Over 60% of the population probably a guess, I do not have figures, the population of India at independence was about 300 million. What is the population today, one and a half billion? It was 1.2, something in the last count 2011. It could have crossed one and a half billion now.

But today, there are more than 300 million poor people. That is the entire population of India at independence by these definitions that I am talking about. Now that number will vary to 290 or 350, depending upon who is calculating. I am an economist and we are in the business of academic, we have to publish papers. And how do I publish a paper, I disagree with you. So we have these nice fights from economists.

But at the end of the day, I can say this that whether it is 300 or 320 or whatever, it is far too many people who are poor. On that we cannot disagree. We can make one other statement. That is if you take it as percentage of the population it was 60% who were poor at the time of independence and it is now probably 30 or 31 or 32%. So percentage wise, poverty has decreased.

In absolute numbers picture is not so good. Now in a country of this sort what is the kind of ethical imperative on the economies? If you are talking of right and wrong, can you talk in terms of a free trade policy? Can you talk in terms of a policy that makes the rich richer and leaves the poor where they are? And the gap between the rich and poor keeps increasing.

I think this is an ethical question. I can simply say that these are my assumptions. These are my analysis. This is my policy recommendation. Sure. But we are now talking about ethics and ruminations about ethics and are there ways around this? Yes, there are schools of thought. Nobody has the perfect answer. But some of these insights based on what I said about poverty and the poor and so on.

There is a whole tradition that goes back to Karl Marx, and his analysis of classes. Now there has been a lot of historical experience and whether Marx is right or wrong is open to debate. But the point is that the concept of class has a validity in economics, which must be used, whether in the Marxist way or not. Furthermore, in this country, we have another category called caste.

And there is a huge correlation between low caste and poverty. These are realities that cannot be ignored. So we cannot go with the assumption that by and large all are equal. So in this connection, we have to go forward. I only want to give a few more examples before I end. One of the things that we did was to say that, look it is very expensive to invest in R&D.

There is a lot of knowledge, there is a lot of technology available in the world, and we can bring it. And how can we bring it? We can talk to those who have the technology and persuade them to give it to us and pay a price for it. It is another good like anything else. So in the early years, in the 50s, and 60s, when we were supposed to be communists, a lot of the technology came from Czechoslovakia, Soviet Union and places like that.

Hindustan Machine Tools for example were built with Czech technology. Hindustan Aircraft had a lot of and oh Bhilai was Russian, a lot of this. It came in and we built our industrial structure. But very soon, we realized that the Soviet Union itself was

sort of falling back, we need to go elsewhere. One of the big successes of bringing in technology is agriculture, what we call the Green Revolution.

Green revolution initially was of, the management of it was important because not just better seed or better fertilizer, because a very carefully considered combination where you identified farmers with good land, good access to water and then they were given better quality seeds, which had been tested in laboratories.

You gave them the appropriate fertilizer, you gave them the credit, and you gave them a guarantee that what you grow will be bought. So you reduce the risks that the typical farmer faces. And this was called the new agricultural technology, Green Revolution. And it did wonders, there is no doubt that it did wonders, because from 1967 we had a famine, where millions died.

And since then, the Green Revolution came in we are self-sufficient in food. For a country with a growing population as large as ours to have self-sufficiency is not a small thing. I mean self-sufficient in the sense that so many calories per person per day into number of people mean so much food, we have that much food. Lend me little bit of rice here, then we can sell something, buy it, we are self-sufficient.

That is a big thing. It is a big success. But what when you look back on the Green Revolution, what is it that you find now? There are unintended consequences. The unintended consequences, for example, on the fact that excessive use of fertilizers has led to soil degradation. It is very difficult to regenerate the soil. The traditional patterns of multiple cropping, leaving land fallow.

We gave it up in order of intensive monocropping. Fertilizers was used, output increased, but we kept doing it year after year and then to get the same output from the same piece of land you had to give greater doses of fertilizer, greater doses of pesticides. And I believe now we have reached a point where you find DDT model. (39:10). So there is a unintended, nobody intended this to happen.

It is an unintended consequence, we have to deal with it. So it is a new problem. And in economics, a lot of problems are wicked problems in the sense that there is no one

solution. The problem is a little fuzzy. We had a problem of food, we dealt with it. But when you look back on this experiment, what happened?

The main diet of people of India across particularly in the drier regions of the country, was what is called coarse grains; ragi, bajra, you know jowar, millets in English, various kinds of millets. I happened to be speaking to Justice Venkatachaliah who was a retired chief justice. He is about 90 plus now. And he was telling me that as a child, it was all these millets that they ate. And they only ate rice during the festival.

It was interesting. Now we are at a situation where rice and wheat are the staple, many of us have not seen millets. But what has happened is that in order to implement the food distribution system, what we call the fair price shops after the Green Revolution, which was a revolution in rice and wheat, the government bought rice and wheat and gave it to consumers at a subsidized rate.

So what happened is that rice and wheat which were the more expensive grains became much cheaper than millets. People shifted. Today we all eat white rice or refined flour and so on. So it became unprofitable to grow millets. Today millets are staging a comeback as a niche food. So you can get rice at 60 or 65 a kilo, but if you want to get foxtail millet you pay 150 rupees, because less is grown.

It is tragic because the millets are better suited for the arid conditions over large part of the country. So again, unintended consequence, we had to do this. There has been a lot of criticism that the Green Revolution included a certain amount of work, but the drudgery fell on women. So there were gender consequences. Again, unintended, but nevertheless real. So there were lot of things that happened.

So one of the things that happens with economic policy is that you achieve one goal but then something go wrong go somewhere. And you have to correct it. Society is far too complex for a very simple kind of analysis.

I spent three years in Haryana and there was an interesting situation there that along with green technology, which required a lot of labor and was, which for years and since the Haryanvis and the Punjabis were better off and did not want to do the labor

there was labor from Bihar coming in to do the hard work. But at some point, the farmers decided that is not a good thing.

These people are coming from far away, they make unreasonable demands and so on. So look for an alternative. What was the alternative? The government decided to subsidize tractors, combine harvesters and so on. So labor got substituted by machines.

Now the combine harvester which, for example, you have used for harvesting rice, which I have seen. Traditionally, when rice was harvested manually, it was at a ground level, there would be an inch of stalk left. But the combine harvester will get spoiled if it is not at least a foot off the ground. So it harvest your rice, but leaves stalk of a foot. You do not need Bihari labor anymore.

They have lost their jobs. You got this. Now then you find that it is hybrid rice, modern rice. And these Haryanvi cattle are very stubborn, they would not eat it because it has some chemicals. I am not a scientist, some bad stuff in it. So they would not eat it. They used to eat the traditional stalk, they would not eat this. So what do you do, you burn it, you pollute all over North India.

Unintended, tragedy of the commons, stupidity. Yes, all of it, all the above. So we have a series of situations in which we have to deal with this. And part of the case that I am making is from an ethical point of view. One has to question the assumptions on which mainstream economics has been functioning. And it is very much linked to technology, because engineers and technologists kill their technical people.

They know physics, chemistry, things like that. And you have to give them the problem you want solved. And the problem you give them is defined in a way saying you must save one labor. No, no, labor is naughty, labor goes on strike, they form union, they are bad, then they will develop technologies that replace labor with machines, automation, robotics, all kinds of things.

People lose their jobs, they will create a nuisance. And so there is an ethical question here. How do you define, how do social scientists, economists talk of the problem that

has to be solved? Can we talk of the problem of pollution in the North as having the system of production where first the byproducts can be used like the stalk being eaten by cattle?

Can we talk of maximizing labor use instead of my machine use so that whether they are Biharis or Haryanvis, people get jobs. What is the value of jobs in society? So there is this question that you have to do is how to what is the problem that you are posing? Is property sacrosanct? Long ago India decided that property is not a fundamental right. It is a right but not a fundamental.

We had to do this because you have to get rid of the privy purses of the princes. But whatever it is, that it is not a fun. For example, if you have a house and they want to widen the road, the government can take it away from you by giving you a compensation. You cannot fight it. It is not an absolute fundamental right. If that is so why not think of it in the more traditional terms that would encourage the use of collective action.

People getting together to do things. But if you are going to do that, and one of the things that Elinor Ostrom study shows, you need slightly different rules of the game. You need ways of decision making that are not based on short term profits. You need people to agree on a policy. So you need consultative processes. Now these are not parts of mainstream economics. What we need is what in recent research now is we call the Solidarity Economy.

There are examples of this, you would have heard of Muhammad Yunus and Grameen Bank, women's credit groups. There are a lot of evaluations in India, which as I have said these have failed. Because these women who formed the group have not become industrialists. It is true. But what has the self-help group achieved? It has reduced distress. It has given them scope for having a thing so that consumption can be made more consistent.

It is not that you eat when you have money and starve when you do not. The self-help group has given them the ability to have a little bit of savings so that offseason, you can buy, you can sell. So it has reduced and it has done that extremely well. But is

that reason to call it a failure? Here in Karnataka I was part of an evaluation group for a technology development dealing with the science.

You would have heard of this, (()) (47:27) the efficient chulha, wood burning stove. You would have heard of the traditional chulha. You would have seen in North India, people making chappatis on it. It is whatever efficiency means to engineers, it is inefficient. So they did a lot of research and said how can you make it more efficient? And they applied, and they came up with a stove that was about 20% more efficient than the chulha.

And then the government of Karnataka thought it is a great thing, women trudge for miles to collect firewood. They will have less to do, less firewood is used. So it is a good thing. Let us do this. And there was a government scheme to spread it. And after a couple of years, there was an evaluation team of which I was a member to go and look at how it works. And the committee was split down the middle.

Now what basically happened was that if the efficiency that was measured in the laboratories in the Indian Institute of Science of the improved thing was 15% compared to 35% of the traditional. When we went around into the field, we found that the measured efficiency was 25%. So there is one group which said that look, they promised 35%. And we thought 20, it is a failure.

And there is a minority group to which I belong, who said that look they were getting 10 and 15%. Now they get, so it is a success. Now how do you explain the difference? When you look into that you find that the lab conditions under which you work and measure are very different from what happens in the field.

For example, in the lab condition, which was done in Bangalore, the test was done cooking ragi, which you boil, which you boil in a pot and the stove had been designed so that it used heat most efficiently in that pot. And you went up north those silly people do not eat ragi, they eat jowar and make rotis. And therefore, it is not that they were making rotis.

And on top of that, the cooking by a lot of women is done in the evening and night. And this was so well designed that it cut off, it maximized the heat but cut off the light. So in many cases, these women took a nail or something and poked a hole somewhere so that some light came out which was enough for them to see the chappati they were making.

And that reduces efficiency because you are maximizing heat whereas what is needed is a combination of heat and light. Plus, not ragi but jowar. So the field gives you very, very complex problems. There is no one solution to this. You will need one kind of stove for the ragi cooker and another one for the jowar cooker. And God knows if you cook other things. So problems are not as simple as we thought.

It requires a lot of sophisticated science. But the failure has been ours from the point of economics and probably our policymakers in that the problems we have asked engineers to solve, have been based on a certain ideological framework, which when I ruminate and look back has not been in ethical terms the right one. Okay, I will stop here.