

Infrastructure Planning and Management
Indian Institute of Technology, Madras
Urban and Rural Infrastructure Part 1C

Lecture 9

Now we come to I think the point that, was it Shree Anand, you were making the point about slums. So now we come to this point of housing. So there is water that needs to be supplied that is a problem, you know we have, the challenges we have identified. When you start looking at housing, we have all these urban slums coming in so what is the biggest barrier to providing housing to people?

So land is what scarce today and therefore the price of land is also very high. So if you do the economics. So we have these categories, we have what we call low income group, we have got middle middle income group and then we have also something that is below that is called the economically weaker section and we have come up with norms. So roughly you know somewhere this might be about, I cannot remember exactly but it is about 50 square meters, right or about 400 square feet in that neighbourhood of, is what we are actually promising as houses.

Now but the point is when your price of land is is so high, that is what drives the cost of these houses and because of that you find that the overall cost of construction makes something highly unaffordable to this segment. So if you want to look at areas around us adyar today, the cost of land for construction plus construction per square foot is charitably fifteen thousand rupees a square foot, right. So we are saying fifteen thousand rupees a square foot and if you are going to say three hundred square feet, that is roughly in the range of what? Forty five lakhs. Is that what you are talking about as affordable housing? If you are saying I want to sort of resettle people in slums, are you expecting them to pay forty five lakhs? Does not really work. So we really need to start thinking about land economics and how we sort of go about. So there are ways of doing it, one is say look let us figure out, let us subsidize the land. The land is free, it is government owned land we will build. So then it comes down to the cost of construction and if cost of construction is about two thousand rupees a square foot, then three hundred square feet, that is six lakhs. That is starting to become affordable. Something else that we have tried doing is something called Transferable Development Right, so people along the world have been doing TDR. What is transferable development

right? It essentially says, look build here and sell cheaper and I will give you some benefit elsewhere.

So benefit could be the following, there is something called a floor area ratio or a floor space index. What is an FSI or an FAR? Yeah Harsh?

Student: Ratio of built up area to the plot

Professor: It is a ratio of built up to the plot area. So if I give you a floor area ratio or an FSI of two, what that means is I have hundred square meter plot, I can build two hundred square meter of built space. You build four stories of fifty or three stories of sixty, eighty I mean whatever it is you can do but you have got hundred square meters of buildable space there. So here is the deal, build in these, build for these poor people and sell it for the cost of construction and in return, in a very dense sort of central business district kind of area I will give you a floor space index kicker. I will tell you that you alone because you did this charitable thing for me can build at a floor space index of two point five instead of two, which means when all your competitors are taking hundred square meter plots and building two hundred square meters of built-up area, you can build two hundred and fifty. That means there is extra area that you can sell or rent or lease or whatever you want to do in prime locality where the rents and the leasing rates and all of that are high.

So that is sort of one way of of telling people to help. So I cannot give the land for free but I will try to sort of ask you to keep your prices low and help you make your money elsewhere. So it is a little bit of the Robin Hood kind of syndrome, take from the rich and give to the poor. It is little bit of a subsidy kind of model. So those are some ideas on how you work on land, yeah Akash?

Student: Like in Mumbai Dharavi area, most of the people living there, they are living like single house, there is only one story. So if we take that, if they are ready to give the land, like in small land area, we can build multistory building

Correct. So I think that is, the thing is shall we go vertical? Because why do we have just one person sitting on a plot when we can actually have multiple people, so that to some extent again and therefore that land cost is now divided by a number of people. So I cannot afford to buy the plot of land because it is too expensive but it is not me, it is fifty of us in that big multi story apartment trying to buy this, so that brings the cost of housing down and that is actually something that people are looking at.

Problem is that, now starts putting stresses on parking, on the sewage that being generated, the solid waste that is being generated, the water that needs to be supplied, etc. So it is one of those things that, yes you are solving the housing problem but are you creating essentially, one of those slums again because you do not have a way in which you dispose of the waste and so on.

Student: Based on the people living in that particular area, those same people have been resectioned in the same space with lesser area, like we can certain developer, we can offer him a fifty percent of the land and other fifty percent you can build commercial

Yeah, so all of that, the fifty percent allowing them to build houses, fifty percent allowing them to build commercial solves the economics of the housing problem, but the point is, does it create other problems in terms. I have a commercial space now, where is the parking for that commercial space? What are the extra water supply requirements? So yeah, those are good ideas, so going vertical again is a way in which you reduce cost.

Another way in which you reduce cost is you really take a relook at your construction technology, you sort of say, why should I spend two thousand sometimes three thousand rupees per square foot? Why cannot I go and precast elements? Why cannot I use process improvements, lean construction principles all of that and bring my construction cost down to thousand, thousand five hundred rupees a square foot. All of these are the types of levers that people are playing around with regards to housing.

I am going to move on Laxmikanth because we have a few other things I want to talk about. So we can take your, we will take some of these comments late. So that is what is happening in the housing area and of course as as one of you guys pointed out there is the Pradhan Mantri Awas Yojana, which is essentially the housing for all mission state governments are being supported to build.

And many states are actually going in for some of these rapid construction technologies because time is money. If I can start building and delivering houses far cheaper then I actually save on the cost of construction, so those are things that are happening. So these are just the summary of all of these issues, there is all other kinds of things like solid waste management, what do we do with all the waste that the city is generating?. Right now we take a lot of it and dump it in landfills and our landfills are overflowing. So do we have better

treatment methods, incineration, waste to energy all of those kinds of things but also are there better ways in which we can start controlling things at the source, can we start segregating?

So in 2000, there is an act that came out called the Municipal Solid Waste Rules 2000, which essentially has mandated each of us to segregate at source which means when the waste leaves our house, it actually becomes you know there is organic. There is paper, there is plastic all of that, other countries do it. So I believe the German word for that is “Mültrennung” something like that. So yeah I have lived in Germany but in the US etc when I was studying in the US you had all of these sort of boxes out there you put the paper here, the plastic there, all of this.

So those I think are things that we have to really start working on. Now there are certain parts of the city, certain parts of the country where there are primarily Non Governmental Organization led movements, where there is a lot of segregation that sort of happening. Segregation then makes it very easy for you to process the waste. Organic waste can be used to generate some kind of outcome, inorganic waste we can figure out what to do. There is a lot of construction waste because when you demolish a building what do you do with all of that waste? We call it construction demolition waste. So can I somehow reuse that when I am building new buildings because otherwise all that waste is going back into the landfill. So waste management is again something that we haven't really cracked and that is again a big issue that is coming out.

Student: Don't you think that we should focus more on the natural structure of waste management, for example today when someone wants to go and just dump it, they find it more profitable than like processing it?

Correct and so one of my student is doing a PhD on construction demolition waste and this is one of the things that he is finding, is that the economics of actually taking debris, processing it and going and selling it to some other contractor for use on their site does not work out. It is easier for them to just get fresh aggregate and start doing their construction. So either they should be regulatory piece there that sort of forces to incorporate, recycle the aggregate or the economics are worked out in such a fashion that is actually cheaper to reuse this rather than issuing new aggregates. So I think the economics need to be taken into concern.

So these are some of the issues with regards to urban areas. Rural areas have very similar issues, but there are three, I think three factors that we need to keep in mind with regards to

rural infrastructure. Three characteristics of rural areas that I think we need to keep in mind, rural areas have very low population sizes. What that means is that the per capita cost of infrastructure is therefore going to be high.

So if I lay an urban road, that road is connecting tons of people and so one could make the argument that a lot of people are paying taxes and in return are getting this road. But in rural areas the number of people that I might connect by that same length of road might be much lower. So population sizes are lower but most importantly population densities, population densities are lower, so there is related problems. The point is, if I lay a water main or if I build a road, I am serving much fewer people in rural areas than in urban areas and therefore the per capita cost of that infrastructure are high. And add on to the fact that the purchasing power is also low, because most of these people are in rural areas, they do not make as much money. This makes it very difficult to financially come up with models to develop urban infrastructure particularly market led models, where private players can get involved because the economics do not work out where am I going to get the money from?

So lot of it is government led and even governments budgets are scarce and generally you find that your urban bases are basically are vote banks etc. There is more bang for the buck if you spend on urban infrastructure. So these are certain challenges with rural infrastructure and this is again what is leading and so it is a vicious cycle. Rural infrastructure is difficult to implement, so I implement less of it and therefore people tend to migrate more and more to urban areas in search of better lifestyles.

Another related point is that it is not so much just the infrastructure, it is the availability of employment. A lot of people come to cities not because they think it is nicer to live in cities but because there are more jobs in cities. Long time ago there was something that we used to call PURA providing urban amenities in rural areas, essentially the idea was let us stop rural to urban migration by providing urban amenities in rural areas so people do not see the need to come to urban cities but that has not quite taken off yet, we still see a lot of migration, most of the industries are set up in and around cities, etc.

So I think there are, these are sort of the issues with rural areas you can see the population density is very low, fifteen times lower than urban areas. Therefore, the economies of scale do not really work out and you do not have a very good monitoring system either. So rural infrastructure has these additional issues but it is not as if we are neglecting them. You guys had this whole Pradhan Mantri Gram Sadak Yojana, this Yojana, this that, etc there are lots

of schemes for building in rural areas and by the way because of our national highways and this and that and transportation and power etc most villages have some amount of electrification, they are connected through roads something that is happening but maybe not to the extent that we were looking at.

So these are schemes this is actually no longer a current scheme this was the precursor was called the Jawaharlal Nehru National Urban Renewal Mission JNNURM, it finished a few years ago but the idea was let us select 60 odd cities. Let us first motivate those cities to get their act in order so we will get them to change to double entry book keeping, accounting standards and all of that, have them do some reforms. If they reform they will be eligible for some money but we will not give them that money just because they are eligible, we will ask them to actually compete by giving us project proposals and as and when we receive a project proposal, if the proposal is worthy of funding we will give them the funding,. What happens is therefore if I am in Vishakhapatnam and I am super enthuthiastic, then I can get my accounting systems etc cleaned, enact my reforms churn out 20 proposals before Chennai churns out a single one and therefore get all my 20 projects funded, whereas when by the time Coimbatore or Chennai goes to the meeting there might be very little money left in the pot.

So it is meant to incentivise people to be aggressive with regards to urban development, the next version of that is AMRUT, the Atal Mission for Rejuvenation and Urban Transformation is sort of JNNURM version 2, smart cities, etc Pradhan Mantri Awas Yojana all of that. So all of these are, these three in fact these are sort of the same just called differently. These three just celebrated their third anniversary, so there was this big to do in Lucknow which I was invited to, to moderate a panel then so we had all these people. And it looks like, smart city is of course is relatively although they started around the same time, smart city has taken a little bit longer but quite a few states have really jumped on the Pradhan Mantri Awas Yojana and the AMRUT bandwagon and use that funding to develop a lot of urban infrastructure in wide variety of cities like in Madhya Pradesh, Gujrat, many of these kinds of places, forget JNNURM and all of these.

So the thing I want to really come to is a question that somebody just raised. So all of this data you can get on the web on how these schemes work all of that, forget all these let us go to rural and you guys mention most of this. So this is important, let me get to this.

So this is the state of affairs, we are looking at urban infrastructure to start with, who should implement urban infrastructure? One would think that the city, the government of the city should be incharge of implementing urban infrastructure so that's the municipality or a corporation.

If you look at the constitution of India, there are a bunch of list, there are what is called the central list, there is what is called the state list and there is what is called the concurrent list. Central list lists items that are to be executed by the central government, state list lists items that are to be executed by the state government, concurrent list lists items that are to be executed by both governments simultaneously.

The lion's share of facilities that that are required in a city are essentially run to some extent by the centre but to a large extent by the state government, okay through a series of organizations called parastatal organizations. What is the parastatal? The parastatal organization is something like the Tamil Nadu Energy Electricity Board what used to be that Tamil Nadu Electricity Board now it is called TANGEDCO Tamil Nadu Generation and Distribution Company.

Look at the name it is Tamil Nadu, which means it is going to actually supply across the state that is why we call it a parastatal. So if I in Chennai want to do something about energy, so in Chennai we have a municipality we have a corporation of Chennai, an old corporation and all of that. The corporation has a mayor, the corporation has a commissioner, we want to do something about energy, can we? I cannot because it is the purview of the Tamil Nadu Electricity Board, Tamil Nadu Generation and Distribution Company.

So I say fine forget electricity, water, I need to be able to supply my citizens with water, ok. This is TANGEDCO, so they so okay let us do something with regards to water, ok, can they do anything with regards to water? No, because water is supplied by the Chennai Metro Water Sewage and Sanitation Board which a different organization and the rest of Tamil Nadu by the Tamil Nadu Water and Drainage Board.

So I say fine, I cannot do water, ok. How about storm water drains to prevent flooding? Can I do something about storm water drains? In this case the answer is partially yes but part of those drains are owned by the public works department. So when you look at what can the municipality do for urban infrastructure, the answer is very little. Most city governments

whether they are corporations or municipal governments depending on the size so beyond the certain size you are a corporation, lesser than a certain size you are municipality.

City governments have very few powers vested in them, they can take care of street lights, they take care of the garbage, that is one thing that they do, they take care of I already said sidewalks and they take care of some drainage infrastructure, a few activities that they can do. So for all of these other activities, to improve your city, housing, can I build housing? No I cannot because it is the Tamil Nadu Housing Board or the Tamil Nadu Slum Clearance Board that is going to build the house and so I am constantly at the mercy of all of these other organizations, the amount of funding that has given to them and the strategy that they have.

So municipal governments have been sort of mute spectators in many ways, to infrastructure development. Now of course, a lot of people have a problem with this because my point is if I want to build infrastructure in my city, shouldn't I have a say in it or shouldn't I have this ability to elect somebody who can do something about it. What is the point of electing somebody if all that person can do is come back to me and say sorry this year's metro water budget did not include this, or this year's public works budget did not include this, so what is the fun in that.

So we enacted two very critical amendments, I put the 74th here, we also have the the 73rd amendment which essentially wants to take the picture on the left and make it into the picture on the right, where the municipality actually has more roles to play. So this is a constitutional amendment, it was actually enacted I think in 1993 or 1994, 25 years ago which essentially asked for powers to be devolved into state governments, essentially say take things away from central government give it to the, so, not state government, give it to the city government, let the cities run their own affairs.

I believe the 73rd amendment was focused on rural area, so essentially said devolve powers to the Panchayat which is our rural form of governments, 74th amendment was for the urban centres. But the problem is that, this has, while the constitutional amendment has been executed, these powers have still not been devolved and often given reason is that the municipal governments do not have the capacity, they do not have the people, they do not have the expertise to absorb these functions. We do not necessarily have the smartest and best decision makers at the municipal level. So giving them all these powers would actually make things worse, we need to centralize it where we have a cadre of technocrats, bureaucrats very smart who can manage this.

Student: Sir, what is the change in funding situation in both the cases ?

So the idea well that would also then be consequent, right, so essentially the idea would be if I were to take care of water then theoretically I should also collect the water revenue. Currently municipal governments collect property tax. This is your main source of revenue and given the property tax regimes and the fact that not all of us pay property tax and this and that, there is not whole lot of money in to actually improve the infrastructure of the city.

In fact if you look at the budgets, a large portion of the budget actually goes into manpower, paying people rather than into infrastructure. So it is normally a two third's, one third kind of split. In fact if you guys are interested, the state finance commission is coming out with a report on September sixth less than a month from today. So keep an eye out for that and you will sort of find a lot of thinking of how we are thinking about our budget, so that is actually a very interesting and important report to read. But anyway, so we have relatively limited revenue as a city, we have very limited powers and this has been one of the challenges with urban infrastructure that we have always therefore think of the highways department says okay I will think of roads but I will think of it at a state level not necessarily at a city level and what we are slowly trying to do is to move into these kinds of structures we have not been quite successful in doing that yet.

Smart cities is another example of trying to do something similar. Smart city ,is again the idea is to say look I will create something create a special purpose vehicle, create a private company which is owned by the city. So we have created something called Chennai smart cities limited. So create something that is owned by the city, the central government will put in thousand crores into that and the city can then decide what to do with those thousand crores. So we are trying to sort of get city governments to be far more responsible, this is where capacity building comes in. So a lot of workshops are aimed at saying okay, now you guys have never dealt with these kinds of sums before, you have never done these kinds of projects, every time so if you wanted to build a metro rail you had a separate organization to do it, if you wanted to build an airport you went to the Airports Authority of India, corporation never did anything.

Can we now gear you guys up to work with these mega project, can we gear you up in project management, finance, accounting, latest in construction technology, land acquisition methods and valuation techniques and all of that. So that is where capacity building comes in. So this in some ways is one of the reasons why urban and rural infrastructure find it a little bit more

difficult to get going because the urban and rural governments do not necessarily have the power to actually enact their decisions and that is what we are trying to change from a constitutional perspective, right at the start, right at the founding document of the country is sort of being changed.

And of course we have talked about specific risks in solid waste, in housing, in water, etc which are all things that we really need to solve because we do need housing for everybody some level or the other, we do need water for everyone, the lack of water not only is bad for people who do not have the water but is also bad for the surrounding community because then these people are likely to fall sick more often and that might then propagate throughout the community. Your workable work force is actually diminishing because people are actually out sick most of the time and all of those kinds of things.

And you are constantly withdrawing ground water, so ground water tables are going up, you have ecological damage that you are creating all kinds of issues come with this. So, yeah, you can talk about it. But that sort of in a nutshell is again the situation we find ourselves in with regards to urban and rural infrastructure. Of course we have a lot of time in this class to talk about what the potential solutions can be and we will sort of do that going forward. We will stop here.