Urbanization and Environment
Prof. Jenia Mukherjee
Department of Humanities and Social Sciences
Indian Institute of Technology, Kharagpur

Module-02
Incorporating the Environment in Urban Planning
Lecture – 08
Networked Cities: "Path – dependent" Consequences

Ok. So, with this we come to lecture 8 which is on Networked Cities: "Path-dependent" Consequences. So, like network cities we discussed sanitary cities in the last presentation lecture 7. So, now, we will be discussing network cities by mainly focusing on the robust elaborate networked infrastructures you know that emerged in these cities of the modern west and which actually kind of generated path dependent consequences or path dependent implications.

The path dependent is an interesting concept which is frequently used in the economic history and also in the history of technology and it implies that you know a particular path is chosen where certain key technological choices you know are made. And these technological choices, you know they remain almost irreversible and they leave little room for maneuver for both you know urban policy and you know urban policy or municipal policy and urban development.

So, by this I mean you know the chosen path which is taken it remains almost irreversible or it can be changed, little bit of modifications can only be made at great expenses. So, you know here, we are going to see that how networked cities generated a path-dependent consequences that is almost irreversible set of urban environmental conjectures and trajectories.

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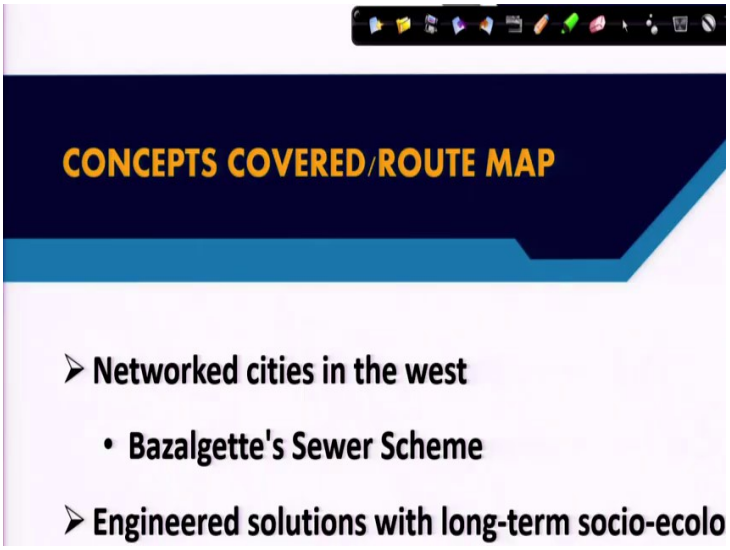

So, yes two major things that we are going to cover here, are like this rise of the networked cities in the west with maybe, one or two examples on you know robust elaborate service schemes including, Bazalgette's Sewer Scheme. And we would also concentrate on like how this otherwise very meaningful or fruitful engineered solutions which could accomplish the short term. You know the short-term agendas or municipal visions and missions actually also kind of generated long-term socio-ecological implications.

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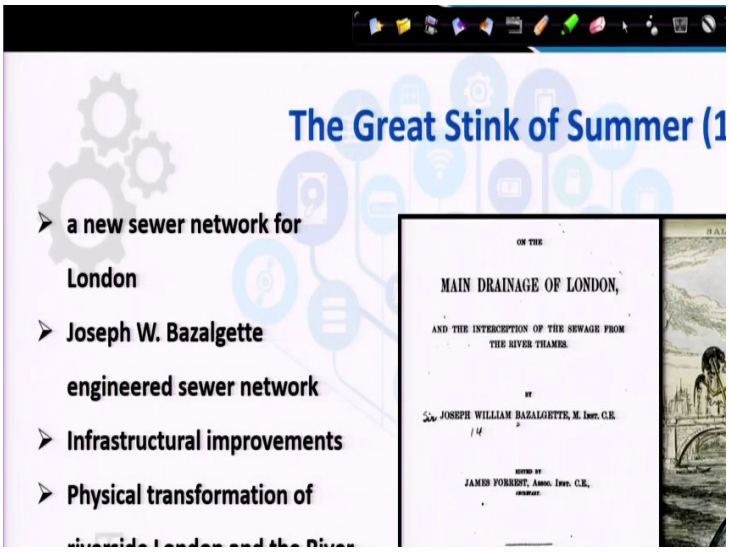

So, you know river Thames. It was becoming polluted; more polluted with industrialization and with mass migration with the development of you know with the

development of settlements which were occupied or inhabited by vulnerable marginalized communities, coming from the suburbs coming from the countryside and. So, like Thames during this particular time during the early part of the 19th century it can be I mean it could be considered as the largest open you know polluted drain.

The situation became extremely beyond control. The situation went out of control with this particular event which in history is known as The Great Stink of Summer 1858. So, this particular event I mean, the idea I mean what happened is that the Thames it started rotting so much that you know and that like it became very filthy. And Europe was or London was not being able to afford you know this stench and like it became so filthy that you know during this particular point of time in 1858 parliament declared closure of the River Thames for few days.

And so, the Londoner's became desperate to come up with a solution and it was absolutely understood that yes an appropriate sewerage network or sewerage design or plan was very much you know I mean it was imperative for the city. So, with this the parliament also sanctioned an approved like grant for the launch of a new sewer network for the city and Joseph. W. Bazalgette; he was chosen as the chief engineer for the London metropolitan committee and he was given the charge to kind of design this you know this sewer network for the city of London.

And this can be considered as one of the grand designs of the 19th century, which was which I mean, like it was heavily in it was a heavily investment laden plan. Of course, it sought it I mean lot of infrastructural improvements could be sought and the immediate problem of filth could be tackled to a great extent. And not only that, this also brought physical changes physical transformation of riverside London and the river Thames.

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So, with this we you know this is the map. So, with this we move on to the grand sewer network scheme designed by Bazalgette. So, if you see that you know your yeah. So, Bazalgette with the whole system was all about you know channelizing this raw sewage or channelizing effluent. So, he I mean in this plan, you will find like a series of street sewers.

So, this street sewers it channelized the raw sewage or the waste and finally, carried the waste to the main intercepting sewers. So, these street sewers or series of street sewers were connected to the series of main intercepting sewers which you know carried this effluent to the to further downstream and to tidal and dumped it or discharge it into tidal Thames and finally, it was swept out to the sea. So, this was the system.

And. So, in this map you can see that a and from the map you can understand that in the on the northern bank of the Thames in the eastern side, the major outfall work was the Beckton work. And on the southern part on the southern bank it was the Crossness. So, like sewage was stored here for some time and finally, it was dumped or disposed on the outgoing tide.

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So, this was the system yes. And not only like European cities sorry, not only London, but also several other European cities like for that matter Finland like Amsterdam, Munich, Berlin, Spanish cities like Madrid, French cities like Paris. So, during this particular period between 1850's and roughly 1870's 1880's, we find the first modern water and sanitation services being laid out on the city scapes.

So, for example, Tapio Katko, he has done lot of research on Finnish cities. And from Tapio Katko's several papers and works, you can find out that you know how like this first modern waterworks and sewerage services were established you know during this second half or the early second half of the 19th century. And Katko you know Katko did a lot of research on the rise of various Finnish cities modern Finnish cities like Helsinki, Vyborg, Tampere and Turku.

And one interesting information a piece of information that we get from Katko's works is that not only for not only to cater to the needs of drinking water supply. But also, you know water was very important water was needed for firefighting service you know, because the houses in these Finnish cities were made of old pine trees and catching fire you know was a very frequent phenomena in the cities like Helsinki, Vyborg, etcetera.

So, Helsinki for example, in Helsinki by 1876, this city became absolutely networked. And as I mentioned in the last presentation as well that you know during the initial phase, these investments or the designs were made by private companies, but later you know it was acquired by the public sector by the municipality. So, initially Helsinki and

Tampere, but after that Vyborg, Turku all these cities started getting covered by you know by water and sewerage services.

And Vyborg is also very important, because like in 1892, Vyborg developed a very elaborate ground water system and this was the, this was very unique and this was the first example of an elaborate groundwater system in any European city. And for that Vyborg also got a special award in the annual health fair that was held in Saint Petersburg yes.

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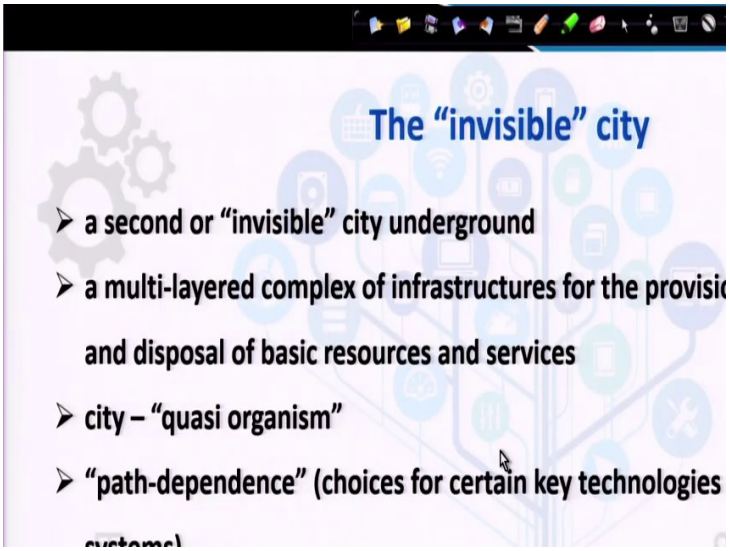

So, there was the rise of the invisible city. So, why invisible? Because a second or invisible city actually emerged underground a multi-layered complex of infrastructures for the provision with and disposal of basic resources and services. So, city was considered to be the quasi organism and this water pipes and sewerage services as the body's blood circulation enabling the city to function and also you know protecting the city from the poison or from contamination generated from its own waste products.

But again, as I mentioned that path-dependent results consequences or outcomes, also is very you know also very much part of this of the story of network cities you know network cities standing upon network infrastructures. So, the chosen path almost irreversible or maybe, slightly modified or modified to an extent at great expenses or great cause. And also, you know there was a change of direction in how cities started managing their resources. So, we would take a look into this now.

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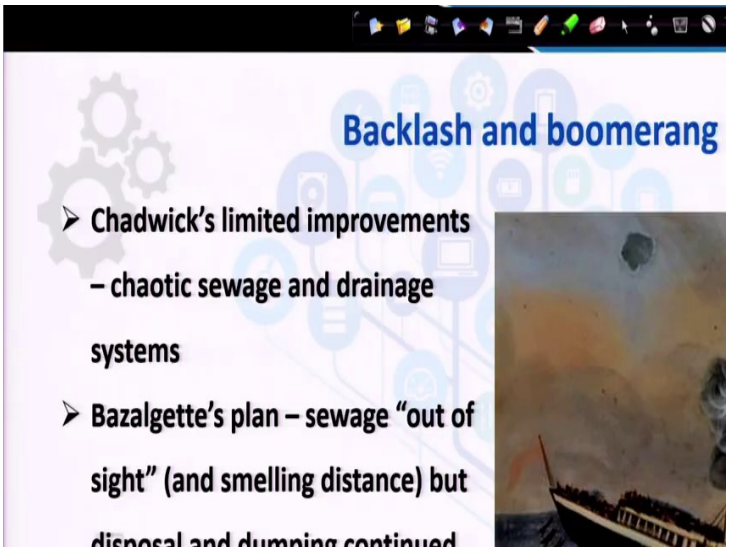

Yes. So, the story is also loaded with you know backlash boomerang unintended consequences own expected outcomes. So, for example, Edwin Chadwick's you know Chadwick. He supported rapid removal of human waste right, but what happened? I mean in order to do that, Thames became more polluted became more polluted, because lot of human waste finally, was getting disposed into the river Thames.

So, Chadwick's limited improvements to chaotic sewage and drainage systems it finally, you know caused more contamination of the river of the water in the river and which also exploded cholera the cholera epidemic in London. So, similarly it is like Bazalgette's plan it was a fascinating plan. It was no doubt it was an extraordinary feat of engineering, but you know his plan could kind of put sewage out of sight ok and smelling distance, but disposal and dumping continued.

So, this reminds me of book you know by Joel Tarr. We would discuss Joel Tarr when we discuss urban environmental history in our subsequent presentations. And so, Joel Tarr; he is one of the very renowned like urban environmental historians who had worked a lot on history of you know urban technologies. And so, he talked about this search for the ultimate sink. So, is there any ultimate sink and the answer is no.

So, you know maybe like Bazalgette's plan was important. And it could really meet or cater to the short-term agenda and mission of the municipality of municipal governance. But you know disposal and dumping continued and the search for ultimate stink it could

not come to an end. Apart from that, you know several other incidents occurred. For example, there is one particular incident of 1878, which is known as the nasty incident of 1878 in history.

So, what happened? This you can from this is the picture of that nasty incident. And, what is this nasty incident all about? So, the luxurious steamer called Princess Alice, it collided with Fritta and sank in you know it sank into the River Thames and this was near the outfall.

So, what happened is that 600 people lost their lives in this incident. And it was found out after thorough investigation that you know people who actually lost their lives, they died by you know by swallowing or drinking poison or contaminated water rather than by simply drowning in the river. So, this is very very unfortunate.

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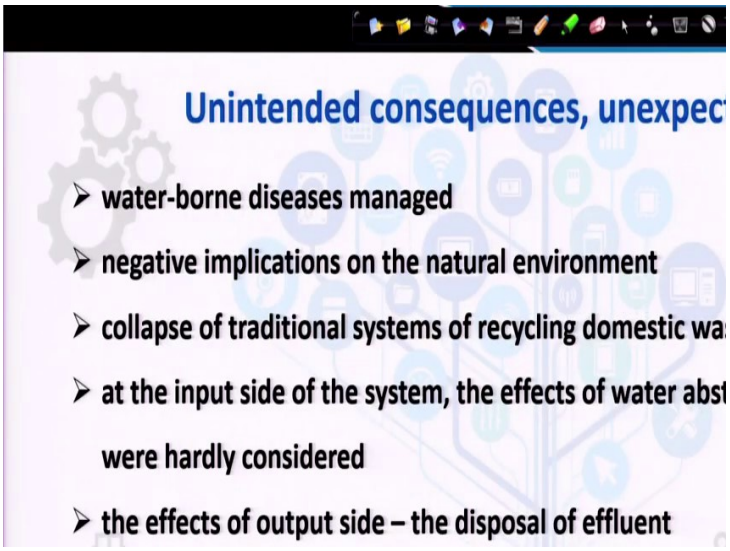

So, like water-borne diseases were managed most importantly; cholera, but you know negative implications also were crafted on the natural environment. So, for example, like with the combined modern sewer system, it became absolutely impossible to separate or you know segregate the more dangerous contaminants before they entered or these entered into the system.

Again, what happened is that you know when these streets were full of rubbish, which were organic in nature it was still alright. But when you know horses were replaced with

motorized traffic or motor cars. The waste or toxic substances like oil like rubber wear off like asbestos you know were generated. And these inorganic or toxic or obnoxious waste you know it became a major problem a major crisis you know for the cities.

So, with the collapse of traditional systems of recycling domestic waste, there was really there was lot of pressure you know on the urban space and on the lives and livelihoods of urban dwellers, citizens. So, at the input side of the system effects of water abstraction were hardly considered. We will come to it in the next slide again. And the effects of output side you know the disposal of affluent remain underestimated.

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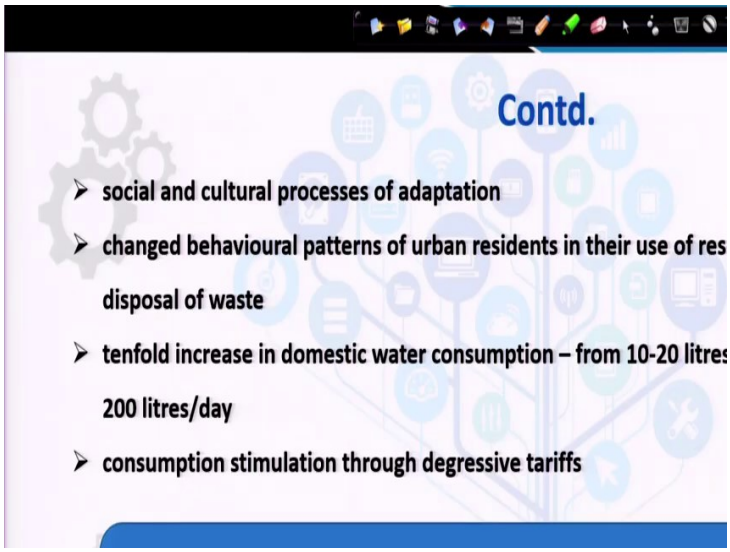

One has to remember and this is you know a strong and an important message that I would like to convey to all of you through this presentation that you have to keep in mind; that networked infrastructures or network cities, these are not only mere technical or physical stories, because they also comprise social and cultural components. So, you know these like changes the rise of the network cities also kind of I mean, it is embedded with social and cultural processes of adaptation.

So, for example, like immediately in this network cities, the behavioral patterns of urban residents in their use of resources and disposal of waste changed. So, for example, in Europe when water was carried by hand from wells the consumption of water per day per individual was 10 to 20 liters. So, it was 10 to 20 liters per day per person, but when you know this manual system was replaced with machines. So, for example, when the cities

had like this sophisticated systems like flush toilets in bathrooms and other like electrical appliances like washing machines, dish-washers etcetera.

So, the domestic water consumption immediately increased to 150 to 200 liters per day per person. So, you can trace a 10-fold increase this is scary actually. So, you can see or you can notice a 10-fold increase in domestic water consumption per day. So, with lot of implications we can understand. And apart from this, you know networking also implies complex legal and institutional regulations right. And like for example, this also determine the or govern the relation between supplier and consumer of these services.

And like for example, this kind of services they have like high fixed costs and low-cost variables. Their economic logic you know the economic logic drove managers to stimulate consumption by degressive tariffs. So, by this I mean that you know the more you the more you consume the less you pay. So, that is the economic logic that is the economic rationale you know on the basis of which this kind of systems actually perform or function.

So, if you understand that you know if like consumption is stimulated through degressive tariff, then it definitely you know kind of favored high rates of consumption. So, high rates of consumption again, it meant that lot of pressure on ecological or so called finite ecological resources against infinite needs of in individuals. And again, like the ecological footprint of these cities increased like anything.

So, again I talked about like Tapio Katko who has who is has who has specialized or who has like produced lot of works on the Finnish cities, mainly on the water supply and sanitation services in the different cities of Finland. So, Tapio this is again from Tapio Katko. So, Katko draws our attention to the pre-networked Finnish cities, where he says that how you know during the pre-networked times all the Finnish women together daily walked the distance from earth to moon.

So, this is the metaphorical, but one can understand you know the essence. So, how all the Finnish women together daily walked the distance from earth to moon and back carrying water from the well to the cowshed and house. So, the kind of attachment they had with water. So, that you know, so they could not waste water and that is why the domestic water consumption rate was so less it was so less you know if you compare the domestic water consumption rate in these modern networked cities.

So, yes so, we had discussed this path-dependent consequences these unintended consequences on nature. So, how European cities in order to become sanitary cities in order to tackle you know bad environment in order to cope with health in order to provide a better environment to citizens kind of like try to deal with environmental problems and vagaries.

But on the other hand, how you know the innovations or the designs that emerged out of this European search for or birth of sanitary cities also crafted severe path-dependent, irreversible implications on ecology and society at large.

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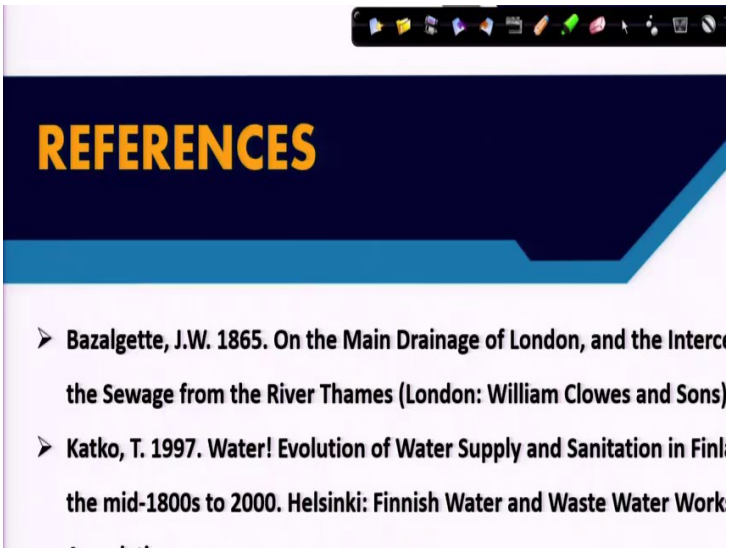

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So, these are some references. This is Tapio Katko. I would also very much encourage you to specifically go through you know the works by Dieters Schott. And we have to cover Dieters Schott when we will actually be discussing urban environmental history as an important urban social science framework in this particular course. So, go through his writings. More importantly this article, but also if you can you can also you know take a look at least into the TOC, the table of contents of this particular book Resources of the City yeah yes.

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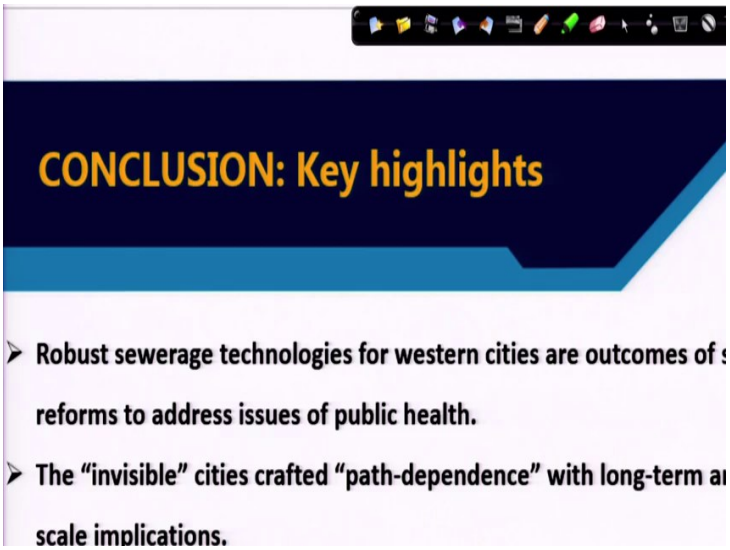

So, to conclude, I would like to say that you know in this presentation, we had covered how robust sewerage technologies you know for these western cities, should be

understood as outcomes of sanitary reforms to address issues of public health. The invisible cities, you remember the invisible cities underground. So, not only the visible city on the surface, but also the I mean the wires, the pipes, the networks etcetera, the complicated you know messy structure at the in the underground.

Also, you know gives us a feel that apart from the visible cities there is also an equal or more important you know invisible component that enables a city to function in the modern or the contemporary times. So, the invisible cities crafted path dependence with long term and large-scale implications and intended and unintended outcomes were generated shaping further interventions down the line and determining urban environmental or city nature dynamics.

So, with this, I would very much encourage you to go through the list of references and to understand you know the city-nature relationship not as a linear you know interaction, but as a mutual reciprocal you know entanglement across dynamic and evolving sets of variables.

Thank you.