Water, Society and Sustainability
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Lecture – 18
Transforming Trajectories of Blue Infrastructure of Kolkata

So, in the last 2 presentations, we had discussed the Water, Society and Sustainability within urban context, right. So, how and what are the complex and what are the additional dimensions when we discuss about the relationship between water and society, when the urban is there in the backdrop? So now, this would become more clear when we basically would focus on different case studies on numerous case studies because, each and every city has it is own story and each and every city has it is own story. So far, as the relationship between the urban and it is beyond urban counterpart is concerned.

So, we would be mainly focusing on city and it is wider ecological surroundings and it will be interesting to focus on Kolkata. So, this is the title of the presentation is transforming trajectories is of blue infrastructures of Kolkata.

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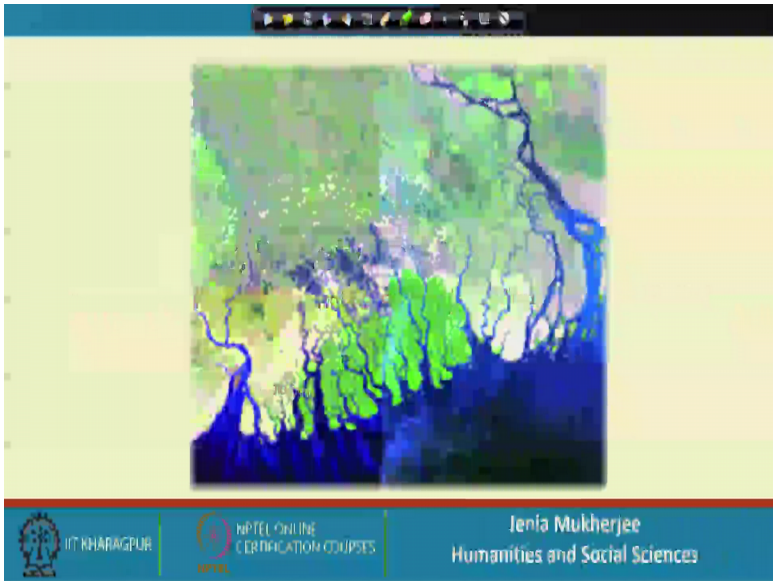

So, Kolkata would be a fascinating case for us to understand the relationship between water society and sustainability because Kolkata's wider surroundings. It actually comprises of river bodies; river bodies, water bodies, rivers distributaries, tributaries, inlets, canals, creeks, ocean and whatnot. So, Kolkata is an integral part of this a lower

Gangetic basin and it also I know it is a continuum to the Indian Sundarbans which is the deltaic part of the Ganges.

And so, it will be very interesting to see that how I mean the relationship between the water body is the relationship between these wilder ecological infrastructure of surrounding in form of rivers and water bodies in the making and unmaking of the city across historical skills of course.

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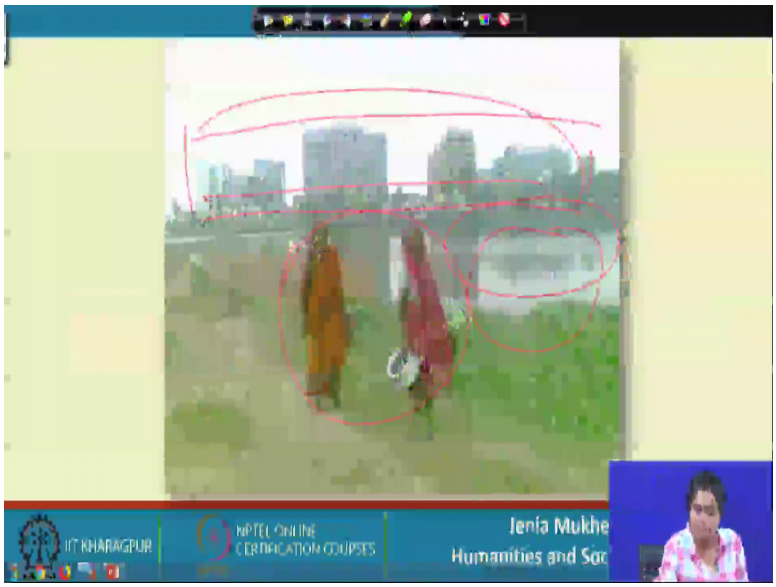

So, this is an interesting a picture showing 2 fisher women from the East Kolkata wetlands. So, in the background, you see the water body which is a part of these Kolkata wetlands. That I will be discussing in detail here and these are the development projects you know the IT firm and also this is the IT complex.

So, which has actually so, this entire area has developed by encroaching upon the wetlands and how that is actually affecting the sustainable flows between the city and it is wetlands. So, that would be an area which will be focusing on. So, this is an interesting picture that you know that reflects on lives and livelihoods of these fishing communities. The wetlands which is the physical ecosystem, the physical environment, and also the development projects; and the relationship between these three.

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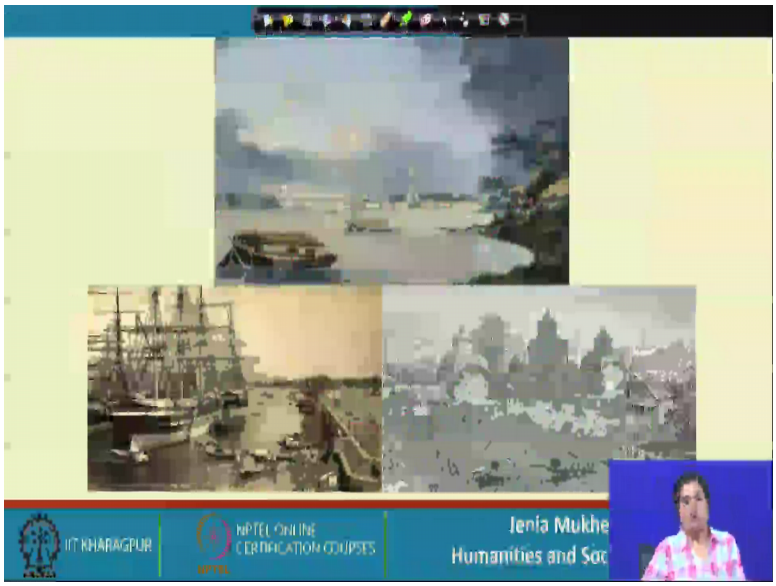

So, these are few old pictures from I mean of colonial Kolkata. So, Kolkata had always meant you know waterscape or river scapes because ah, on one hand we have the Hooghly River. So, this is the famous Hooghly River, the lifeline of the city.

So, the busy Kolkata port on the Hooghly River; this is the famous you know heritage river, the Ganga. Again part of the Ganges and old you know old bed and old stream from the Ganges and again, this is the particular river. It is extremely thickly loaded with history because, on it is banks, and we had this Kalighat, the famous Kali temple. And so, it has it has it is historical and cultural past. So, these are some old pictures or old inner stations of.

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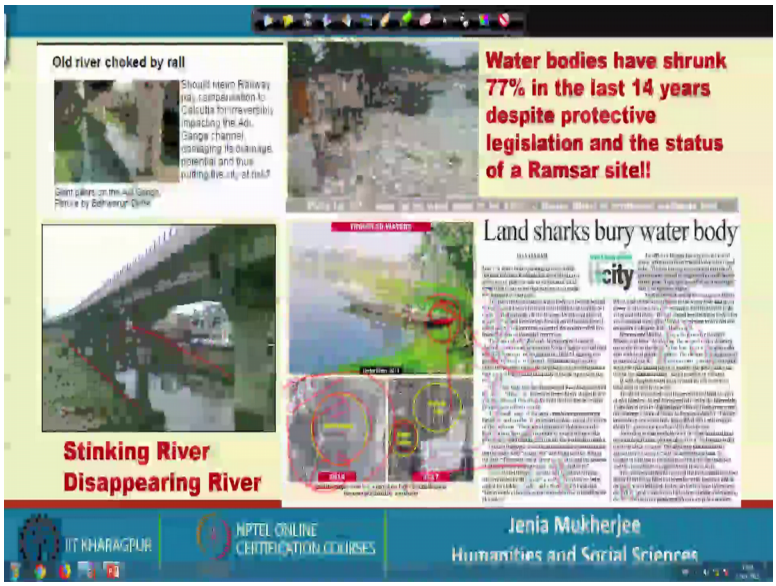

And now, if you take a look into the contemporary types, these are some newspaper clippings from the contemporary times from the like 2008 9 till the presence.

So, here you can see how the water bodies. These are making way to you know realistic. So, this is a map of the satellite image of 2014. So, these are all water bodies and now you can see how these water bodies had been encroached upon how these water bodies had shrunk and how these are really made way to develop big development projects and realistic speculation.

So, within just the gap of 3 years, so, this is a change between 2015 and 2017 and you can see how massively the wetlands and water bodies had been encroached upon.

This is another unfortunate story of the. So, we just saw the picture of the busy Adiganga and the boats on the Adiganga and the Kali temple on the bank of the Adiganga. I mean, it is very hard to imagine that this is the same Adiganga or the heritage river which have totally been in a slotted. But, due to the implementation of the metro railway extension project ah, during I mean between like during the first half of the 21st century, the first decade of the 21st century.

So, Old River choked by rail and stinking river disappearing rivers and this is another data which shows that how water bodies are shrunk 77 percent in the last 14 years despite protective legislation in the status of Ramsar.

Now, this is another crucial issue because, we will discuss that how after a particular point of time few environmentalist and even some enthusiastic bureaucrats. They joined hands with the environmentalist and how you know the green belt for the first time, the green belt was formed within the Kolkata high court on the particular issue of the protection of wetlands. And finally, they were able to mobilize the government and they were also able to mobilize the Ramsar convention and 12500 hectares of wetlands were discussed were declared as the Ramsar site in 2001, 2002.

So, which meant that the implications was that no further construction would be possible within this designated Ramsar site. But then, it shows like how 77 percent you know of water bodies even within the Ramsar designated site had totally disappeared in the last 2 decades or one and half decade.

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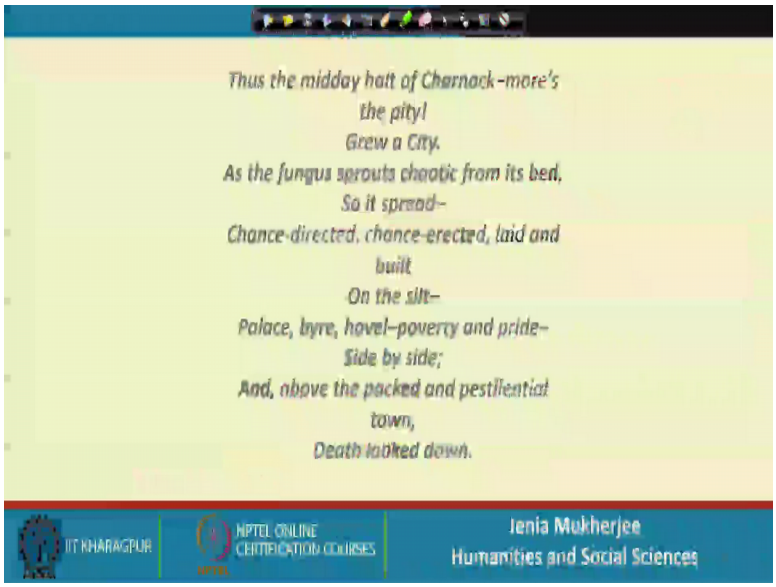

So now, I will follow a methodology which is called back casting. So, I will take you to history. I will take you to the past and I will just discuss like I. So, we saw 2 snapshots like one old Kolkata where one can easily associate Kolkata with the water scapes, river scapes and on the other hand, you know drinking water; so, from canals to nullah's or drains.

So, so, we saw 2 different pictures of old Kolkata and a contemporary Kolkata and now, we will try to join the dots between these 2. As this a particular poem very famous poem on Kolkata by Rudyard Kipling city of red full night where (Refer Time: 08:59) writes.

Thus, the thus the midday halt of Charnock Mores, the pity grew a city as the fungus sprouts chaotic from it is bed. So, it spread chance directed chance erected laid and built on the silt palace byre hovel poverty and pride side by side and above the packed and pestilential town death looked down. So, like.

So, it is clearly mentioned that the Kolkata is a chance directed and chance erected city which I will try to you know counter and prove by my own research that it was really not a chance directed and chance erected city; because, there were very thorough minute strategic calculations behind the foundation of Kolkata. The role of ecology or more specifically role water scapes was extremely important behind the selection of Kolkata as the seat of colonial capital, but as Kipling mentions that he talks about poverty. He talks about pestilence, death and all that and this is quite true in the sense that, if he you know consult some colonial reports.

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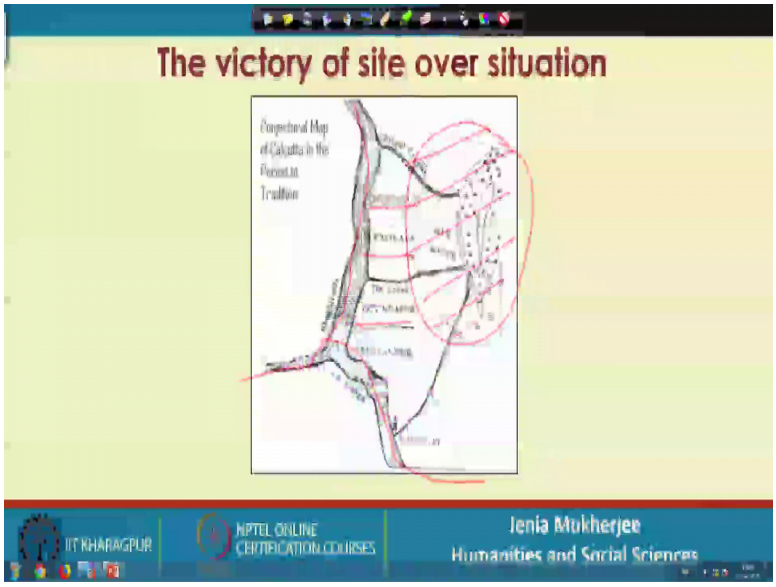

We will find that ah. For example, the reports by Wilson for example, the report by Kole Bruh, even reports by Hamilton, it shows that how I mean, they actually try to describe this particular space as extremely unhealthy because it was a malarial atmosphere and the British's were dying.

So, it was extremely marshy, swampy and there were alligators and wild (Refer Time: 10:21) you know in the area, but then the whole question is if these space was not attractive at all, why finally, the British ah, I mean they selected Kolkata as the seat of

imperial capital? So, this is the question which we need to really you know explore ah. So, we find that if we console other documents for example, alternative documents, we find that from the very beginning, so, Job Chanock came here in 1690.

But, even before that since in 1660s, the British they were actually trying to keep track of the Bhagirathi Hooghly River. Even during I mean in the year 1667, Joseph Tamilson he was appointed as the (Refer Time: 10:43) of the Ganges and what was his role? His role was to you know keep detailed note of the length depth channel, length of the river and also sand variation pattern and all that and he use to keep track of these details. These data and statistics and he use to send this to London and the London court of committee.

They used to you know consult these reports and see like whether these rivers you know would be really significant through which they would be able to make their own fortune and fit.

So, and we see that this is the first map of colonial, I mean this is the first map of Kolkata, precolonial Kolkata actually which is available at the national archives and also at the West Bengal state archive. So, it shows like there is a river Hooghly Bhagirathi Hooghly on one hand river Adiganga and other creeks and canals 3 main locations; the Govindapur village, Chutanutti village and Kolkata and the huge salt water marshes which also has a very long history.

And so, archeological data it I mean archeological data from these marshes could actually make a connection between the Kolkata Sunderbans continuum which is a separate issue and which I would not cover ah, right.

Now, in this presentation, but it is also important to know that on the eastern part there was these numerous, there were this numerous water bodies, salty saline water bodies and this were saline. Because, the Bhagirathi Hooghly River, it uses to carry saline water from the Bay of Bengal as it was connected with the Bay of Bengal and these areas, it was an undulating site or an undulating space.

So, the water saline water carried by the Bhagirathi Hooghly river it could not you know get channelized or drained of. So, these areas remain marshy. So, this was the you know hydrological situation or scenario of the particular site when the British for the first time came here during 1660's and also more specifically from the 1690's.

Now, what is more important is that ah, the British could think that if this particular space can be property properly utilized, if it can be tamed and manipulated through the use of their own hydraulic knowledge expertise and you know technological intervention and innovation, then these space can get transformed into a space through which maximization of profits could be made.

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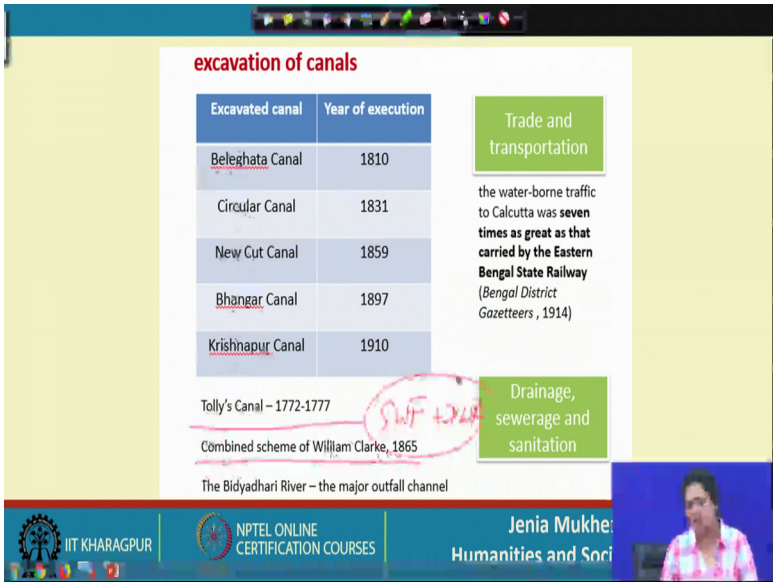

So, what happened is that, they manipulated this particular scape using the rivers 2 major river; the Bhagirathi Hooghly river and the Bidyadhari river and also the numerous natural canals and creeks in between and they came up with a system which is known as the eastern canal system.

So, they use this natural I mean natural space or the natural water courses and rivers which were already there. They manipulated it through the use of their own technological expertise and hydraulic knowledge and they came up with a particular network which is known as the eastern canal network which was connected to the river Hooghly on the west and river Bidyadhari on the east. And finally, which was also connected to the saltwater marshes. So, the connections with the saltwater marshes were made at the second stage much later. So, that again has another history which I will cover. But, for the time being, we need to remember that these eastern canal systems, it was device, it was designed and developed during the later half of the 19th century and it was connected to the river Bhagirathi Hooghly on the west and the river Bidyadhari on the

east. And Bidyadhari it acted as the major outfall channel for this entire area or for this urban site or for this site which was gradually urbanizing.

So, these are the names of the canals with in the eastern canal network; Beliaghata circular canal, new cut canal, Bhangar canal and Krishnapur canal which were all constructed between 1810 and 1910. And of course, it is also connected to the Tolly's canal which is very important the Adiganga, that we had seen. So, these 5 canals plus the Tolly's canal which is the part of the eastern canal system and the Tolly's canal is I mean. So, with the Tolly's canal, it becomes the south and eastern canal system.

And one should also remember that it also includes another, I mean it also includes the history of the development and the construction of what is known as the combine scheme of William Clark ah, which was implemented in 1865. And it is combined scheme means; it consists of 2 canals like the strong weather flow canal and the dry weather flow canal SWF and DWF. So, together with these 5 canals plus the Tolly's canal and the strong weather flow and dry weather flow canal. These were this was an extensive network which actually played the played 2 important major roles for this urbanizing city.

So, one was trade and transportation and the other was drainage sewerage and sanitation. So, this entire network of eastern canal system, it was extremely important for trade transportation purposes, but also for drainage sewerage sanitation purposes. Because, we will get to know that Kolkata from the very beginning, it had no separate sewage treatment plan neither you know. So, the canals, it used to play the role of you know, the canals, the channels carrying effluents and then getting connected to the river Bidyadhari which was the outfall channel and later it became connected to the wetlands where the wastewater or that the effluents were recycled.

And very interestingly, like today we have seen like the contemporary scenario where we have seen how metro railway pillars had been constructed on the Adiganga. But, if we just go back to 200 years, we will find that the water born traffic to Calcutta was 7 times as great as that carried by eastern Bengal state rail. So, nobody can even imagine that you know through those canals which are totally you know, I mean the condition is so bad. So, nobody would say that these are water courses or canals rather you knowthose

are just considered as nullah's or drains ok. So, because they are entirely chocked and they stink.

So, ah, but this is a realities and ah. So, history teachers asks that this, I mean trade transportation, what born traffic through this eastern canal system. It was 7 times great as great as that carried by the eastern Bengal state railway yeah.

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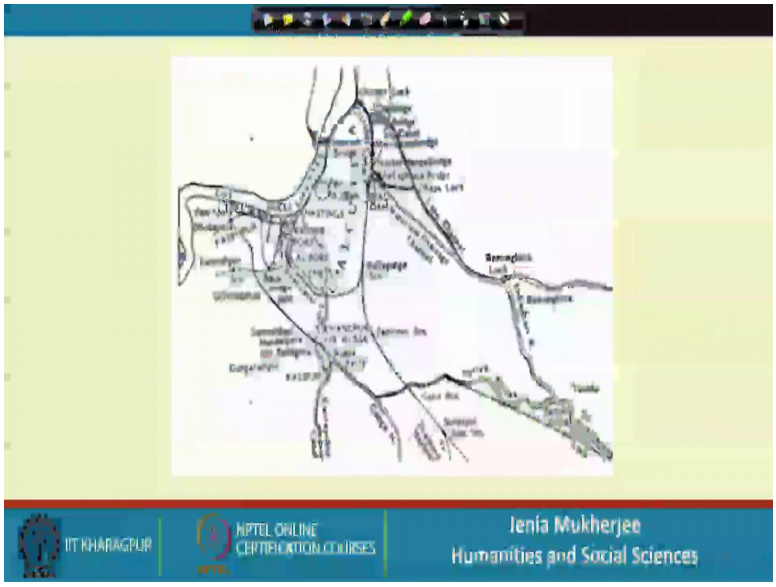

So, this is technical illustration of the network. So, you can see. So, these are very interesting picture which combines the history of a city or the urban technology and nature. So, all the important channels the lake channel and not only the canals ah, but also the slues gates and the logs and this is the out fall channel the Bidyadhari this is the Tolly's nullah which was revived by William Tolly stretch of the Adiganga that we had seen and numerous other canals and logs like the Chitpur logs Bamanghata log and all that. So, it is the technical blueprint of the extensive eastern canal system which was designed by the British.

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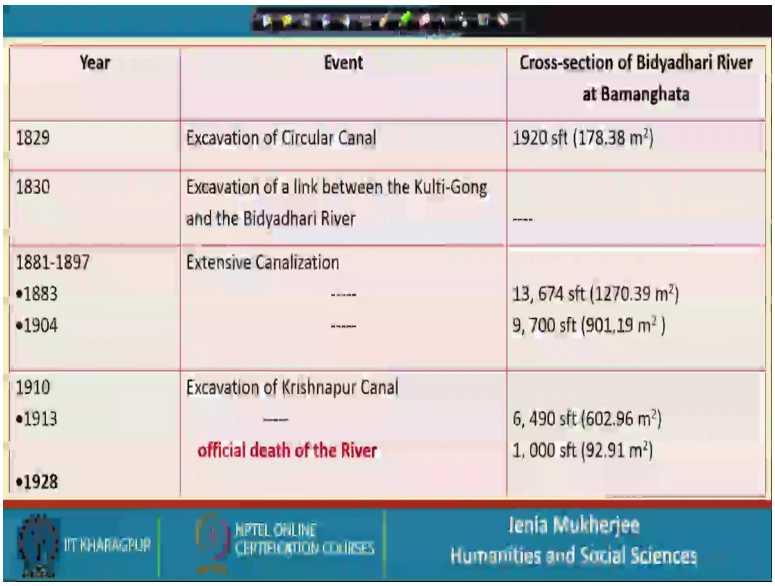

So, this is another interesting history like how there was a transformation in the in the aquatic environment of the marshes from saline to no saline. So, we need to know about the Bidyadhari river and how there was a decline in the flow of the Bidyadhari river and how finally, in 1928 it was officially declared as dead because ah, Bidyadhari faced numerous interventions.

Because many canals were actually drawn by taking water from those were excavated by taking water from the Bidyadhari River and also to a great extent it died, it is natural death. So, there is a controversy among experts, among the colonial experts that what led to the decline of the Bidyadhari River. So, few argued that you know ah, I mean Bidyadhari declined, died, it is natural death. But, others argue that so many intervention and disruption were made to the river that finally, you know there was a lot of reduction in flow of the river.

But, whatever the reasons or the causes might be, the fact is that Bidyadhari was declared as officially dead or defunged in the year 1928.

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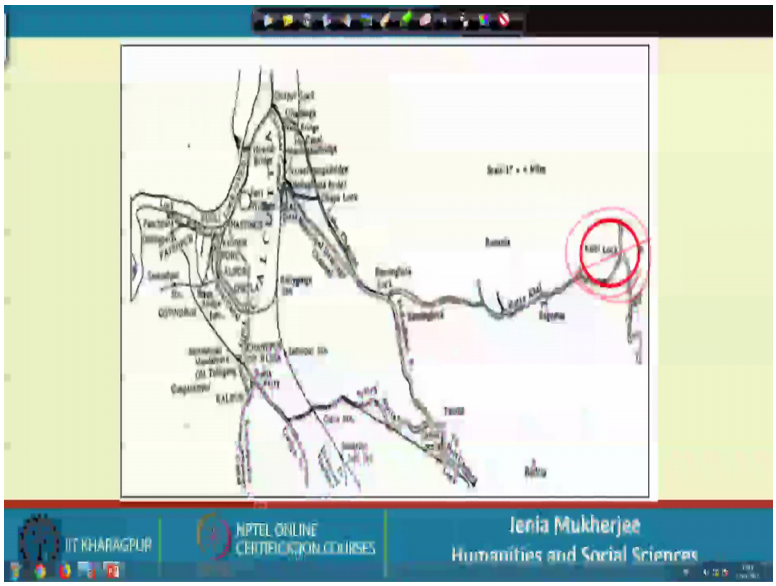

Now, this is an important event because, due to the decline of the Bidyadhari river, the next question was what would be the alternative outfall channel for this urbanizing city.

Then we have a Bengali engineer and an expert called the Dr. B.N. De who devised and came up with his Kulti lockscheme. So, another river which was just located on the southeast; so, this was again another distributory of the Ganges called the Kulti. So, that was of Kolkata or this area actually it has no (Refer Time: 22:04) of river or water body. So, it was quite easy to you know find out alternative channels or you know other things that can be used for this specific you know for the urban land or the urban area.

So, what happened is that ah, since I mean 1930's, this alternative outfall channel scheme was made was designed and finally, a Kulti lock it became the official outfall channel since the 1940's. And so, what happened is that, as I had mentioned that these actually brought a massive change in the aquatic environment of the city and more specifically, in the aquatic environment of the marshes because, we know that Bidyadhari used to bring saline water because it was connected to the Bay of Bengal.

But now, the canals, the eastern canal system, it was connected to the Kulti lock because no more Bidyadhari was outfall channel. So, the eastern canals it became connected to the Kulti lock. And so, this canals use to carry the waste water or the effluent which was no more saline. So, these marshes transform from saline to non-saline marshes and these became the east Kolkata wetlands. So, it was not the saltwater marshes anymore.

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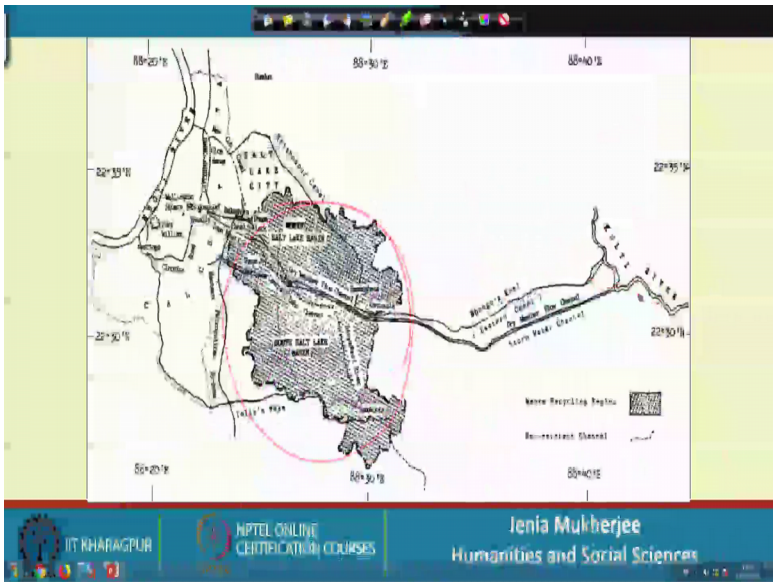

But the east Kolkata wetlands roughly an area of 20000 hectares or more and totally connected to the Kulti river on the east and the eastern canal system.

So, the canals and wetlands it is a it is a part of an integral system one needs to understand this. So, we can never discuss canals of Kolkata without discussing wetlands again. If we only discuss or focus on wetlands ah, I mean it is very important for us to know about the functioning of the canals and also the history of the canals because the eastern east Kolkata wetlands entirely depend on the supply of waste water from the canals.

So, so now, we see that how you know; now I see the history of the emergence of the east Kolkata wetlands due to some changes or some alterations in the you know in the hydraulic engineering of this particular scheme.

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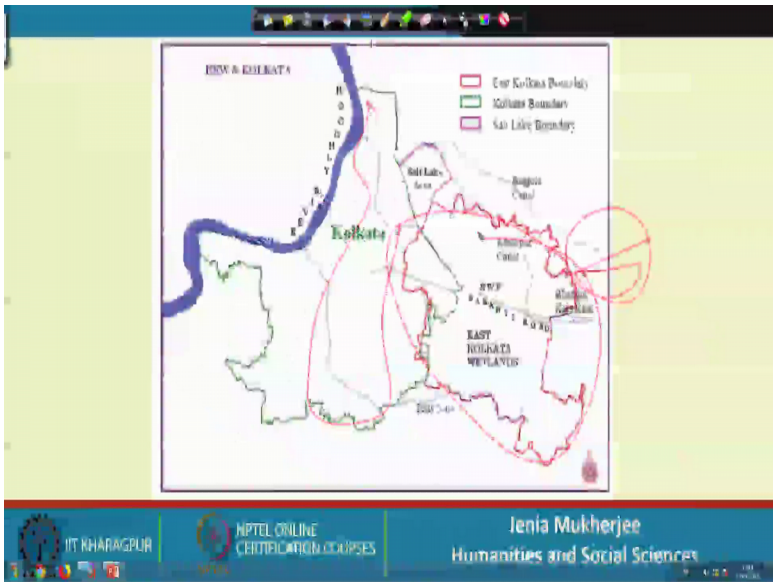

Yeah. So, this is from the E K W M A website. So, this is Kolkata the city and this is her wetlands located at the Peri urban interface. And so, they are totally connected.

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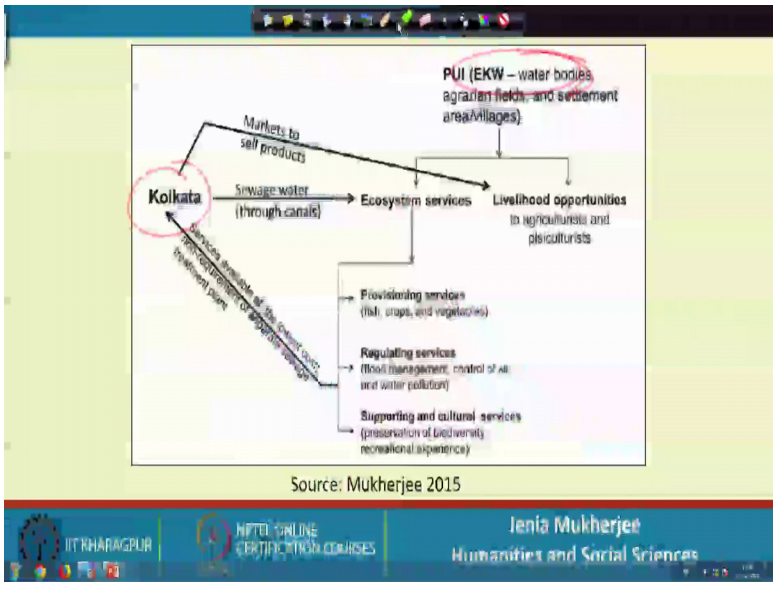

And this is the diagram or an illustration that captures the sustainable flows between the urban or the Kolkata city and it is Peri urban wetlands in the form of roughly 264 sewage fed water bodies. And this is very important because, as I had mentioned that Kolkata has no separate sewage treatment plan. So, you can understand a city with more than 15 million people without any separate sewage treatment plan.

So, it is an entirely you know, it is an absolutely ecologically subsidized city, totally dependent on the functioning of the canals and also the wetlands. So, so there is a sustainable flow between the 2; the east Kolkata wetland is dependent on the city because ah, it receives sewage water. So, the canal carries sewage water from the city to the wetlands and on the other hand, Kolkata is totally dependent on the east Kolkata wetlands because, you know I mean not only due to the fact that it generates ecosystem services, but due to the very fact that Kolkata's sewage treatment totally depends on the east Kolkata wetlands in a natural way.

So, that is why, East Kolkata wetlands is extremely significant and it is the largest you know natural sewage treatment for a particular city like Kolkata not only in India, but in the entire world. So, lot of researches has been done on the sewage recycling mechanism in this particular area.

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And one would be amazed to know that the way sewage is treated or the way sewage is recycled by this wetlands is not through you know not through so, called mainstream science. But, so called small scale low cost or cost effective traditional indigenous folk sciences and there is no documented history on how you know these people or the inhabitants or the wetland dwellers actually started this practices from which period of time.

But, one knows that of course, it has a long history and this inhabitants they practice you know pisci culture by using the raw water or the waste or the effluent and it is a total win situation because it provides livelihood generation or it provides livelihood to the to more than 1.5 lakh people in these area.

On the other hand, if you see this like on the other hand, it generates ecosystem services and Calcutta also ah, I mean can buy fish at a very cheap and affordable price because the distance between Kolkata and the east Kolkata wetlands is the very less. It is a total win situation where the east Kolkata wetlands perform the role of the sewage treatment plan provides livelihood to many people, poor marginalized people and also the city reaps other benefits from this ecosystem resource.

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But, unfortunately we are seen that I mean how the changing political economic imperatives and how the changing development needs and perspectives of a city had really not been able to do justice to her water scapes to her river scapes and to her wetlands.

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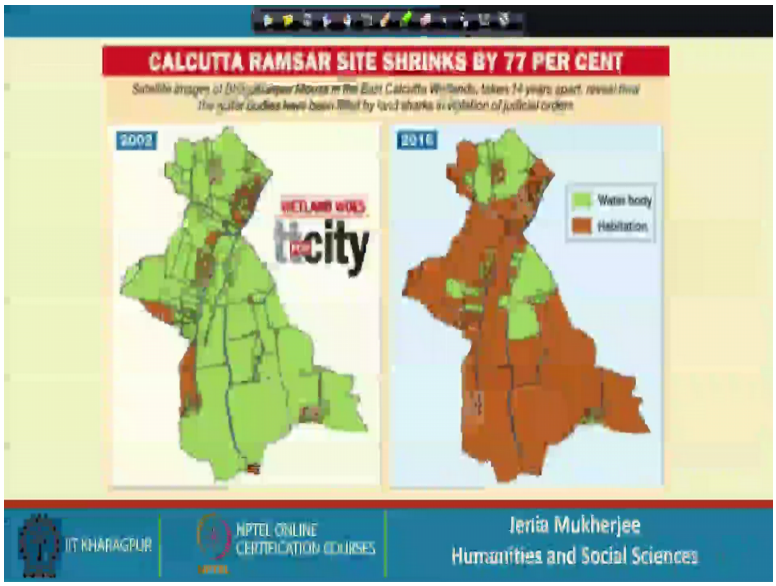

So, again 2 images from 2002 and 2016, we can how at a very fast scale Kolkata is losing her wetlands and what is more important is that ah, I mean the wetlands should not only be saved or protected for the sake of the wetland dwellers. But it is very important for us to understand the wetlands need to be saved, also for the sustenance of the city.

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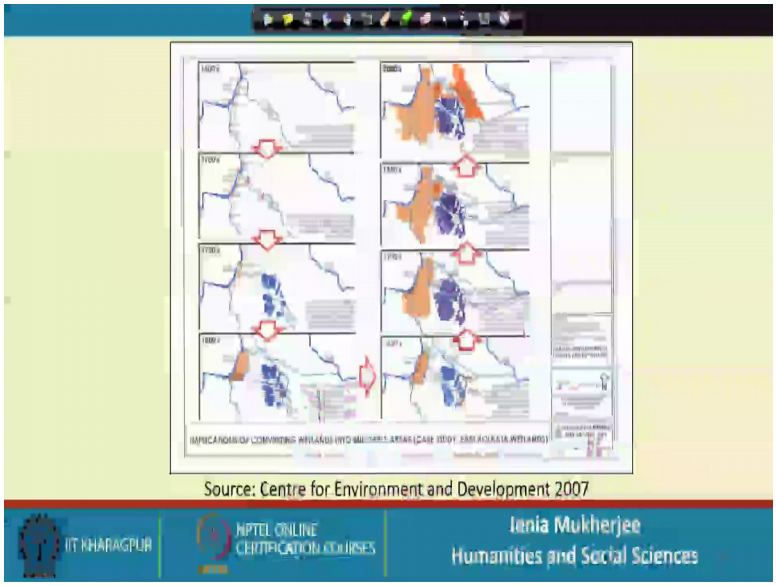

So, this is another map which was prepared by the centre for environment and development it is a little old map 2007 which shows a very interesting map, but like from

1600s to the contemporary times, it changing or the transforming trajectory of blue infrastructure in Kolkata. So, one single you know picture capturing the transforming tales of water scapes of this area.

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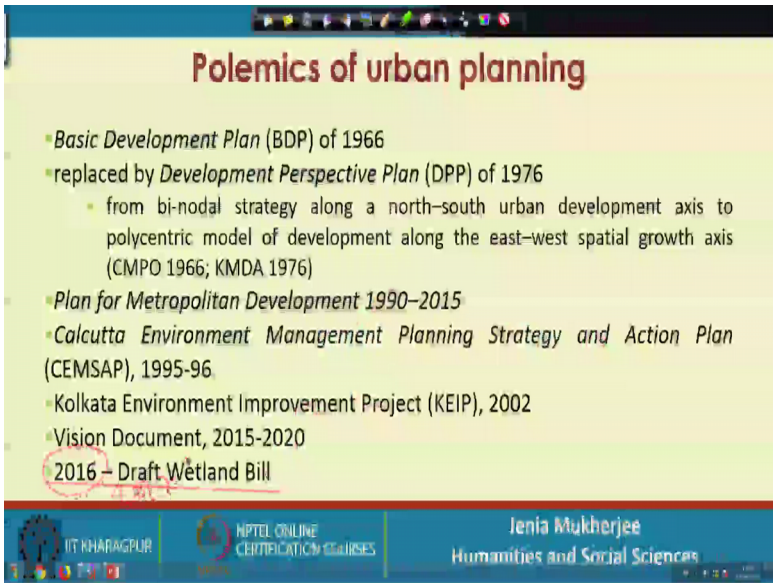

So, finally, I mean it is a big issue and I mean, there can be debates unending debates about why instead of knowing that these wetlands and the canal system and this entire network is. So, very important and significant for the sustenance of the city why Kolkata you know kept on encroaching up on her wetlands and why these canals were not maintained at all since the post independent period.

So, just I mean. So, we will not enter into the debate right now. Because, right now our whole intension was to just to make you familiar with the story or the relationship between Kolkata and her waterscapes and how I mean this the relationship, it change across long term, across long term temporal trajectory or across long term historical scales.

But one thing is that, like if we if we try to understand the polemics of urban planning and development, then we will find out that how during the 1960s, it was said that you know when I mean if Kolkata had to expand, then in it had to follow the binodal mode of development which means that, it should expand north south.

But then, how this plan was not implemented and finally, when the development perspective plan was launched in 1970s how this binodal strategy was totally violated by polycentric strategy which state that we know the expansion would occur in the east west side.

So, mostly in the eastern side and that had led to you know the conversion of wetlands into estate and this area, it is extremely profitable and it is extremely what to say I mean the real estate's speculators. They are really attracted to carry on development projects to pursue development projects in these particular parts of Kolkata.

And it is going on in a rampant you know massive scale and more over the last point like recently actually I think in I have to checked it, I think it is 2017, I just have to check. So, I have written it 2016. So, maybe it was formulated in 2016 and it was actually passed in 2017. It is another interesting bill.

So, the draft land, wet land draft, wet land bill which says that no more the centre is responsible for the protection of wetlands. So, it gives power to the state you know so far as protection of wet lands. So, it gives power to the state you know so far as protection of wetlands are concerned and one can understand like what would be the great consequence of this passage of the wetland bill. If you do not have any standardized, you know central litigation regulation or policy yeah.

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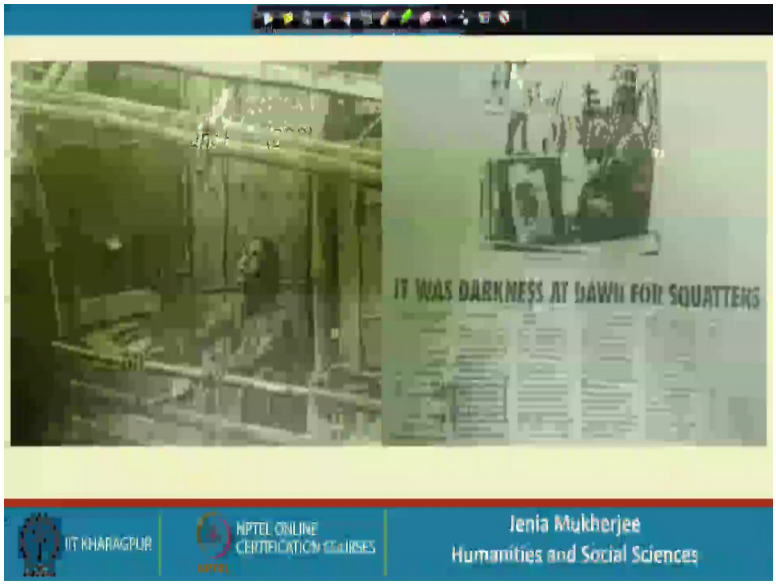

So, so, this is not only the story of degradation of canals it is also the story of displacement of people. And so, people residing on mainly these quarters. So, again another interesting terminology to legitimize and justify a government's policy of a displacement, because there is a difference between slums and quarters; so, slums means where you know people have their land deeds. So, it is complicated, but then I am trying to make it simpler here.

So, it is quarters means, where the people they actually do not have the land deeds. So, ah. So, they are more on the verge of displacement. So, if the government once you know they can be evicted at any point of time , but very unfortunately you know this people actually they do not have land deeds, but they actually have voters card.

So, you can understand that how they are used as vote banks for specific, I mean during specific regime of particular government rule, but then they can be displaced or evicted at any point of times. So, same thing happened. So, these quarters located on the banks of the Adiganga or the Tolly's canal or for that matter that the Bellighata canal.

They were displaced like anything even you know (Refer Time: 34:02) was launch and it really took violent turn and unfortunately Kolkata was ruled by the lieuties government during that particular point of time. But, so, a particular publication came out in 2008 by the human rights law network and very, very, very unfortunately you know myself being a Kolkatan, it is it is a pity to share this particular fact with you, but it is real that ah, I mean in this human rights law and network.

They did a survey of the 8 cities where eviction and displacement had occurred due to the contemporary development projects and they found out that the displacement that had occurred in Kolkata was the most ruthless.

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So, finally, lot of interesting developments are going on one cannot deny that for example, there is this kip Kolkata environment improvement project and other river restorations schemes and beautification project are going on Rajarhart be has been designated as a green city. So, previously I mean it was said that Rajarhart would become a smart city, but then there was an issue. And so, the state government came up with it is own plan of making Rajarhart a green city. But it is again a pity and it is very unfortunate to think that you know, though massive forestation rain water harvesting recycling and waste water recycling.

All these schemes are being planned for this newly made Rajarhart. One has to keep in mind that Rajarhart has actually come up on you know huge acres and hectares of wetlands. So, the wetlands have been filled and Rajarhart has come up and now we are trying to make Rajarhart a green city with all these rain water harvesting schemes and all that. So, what I would like to say is these are to an extent quote unquote cosmetic initiatives and this cosmetic initiatives.

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I mean, make us blind or you know through this, I mean if we become attracted and if we if this cosmetic initiative, they start drawing our attention, then we will actually we will actually we forgetting the metabolism or the real metabolism between the city and it is wider ecological surroundings. So, we would be instead mainly focusing on what is known as ecology in cities. So, the idea is not to you know remain focused on and restricted to the ecology in cities concept.

Because, what is more important is ecology of cities where these kind of an idea is there where the city itself is an inherent part and parcel of the larger you know of the larger environment. So, the city has an integral relationship between I mean with it is environment with it is water bodies with it is river scapes and one needs to pay you know real respect to that fact. So, if we start believing the paradigm of ecology of cities when we would be more aware and conscious to come up with you know schemes or initiatives or policies.

That would be viable in the long term that would really be I mean that would really be able to address the larger goal of sustainability rather you know focusing on sporadic and cosmetic initiatives like river restoration schemes here and there, but not reallyyou know taking into concern the greater detail towards a more sustainable future.

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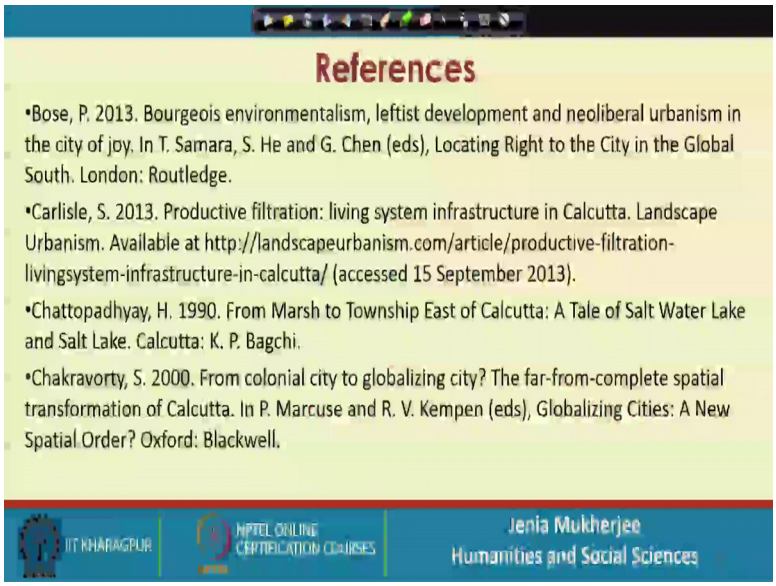

So, these are some of the references.

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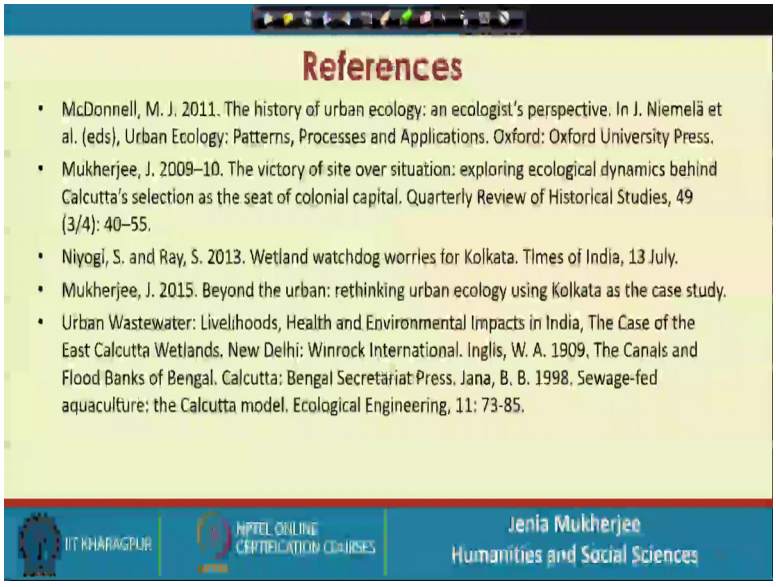

So, that covers both theories relating to urban ecology and paradigms like ecology in cities ecology of cities. And also, there are some references focusing on the primary case studies mainly talking about the east Kolkata wetlands and the eastern canal system, some historical documents as well. So, that really provides a comprehensive picture of you know the larger issues of water and water society and sustainability within an urban

space, within the urban context specifically Kolkata so far as this particular study is concerned.

Thank you.