Course Name: An Introduction To Urban Ecological Heritage: Theories and Applications

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Living Systems Infrastructure of Kolkata

Living Systems Infrastructure of Kolkata. In this lecture, I will be narrating some stories actually and these stories constitute the socio ecological descriptions or realities or narratives from the East Kolkata wetlands. So, I have put Kolkata in brackets because East Kolkata wetlands and Kolkata you know I considered them as embedded entities. Then I would also discuss a bit about the concept of WEB. I think we had already discussed WEB in one of the previous lectures, but here I will get the opportunity to further you know expand this idea or concept of WEB which shows which demonstrates how again you know Kolkata and East Kolkata wetlands co-constitute each other. And then the most important part would be the discussion on why and how we need to rethink infrastructure and this rethinking of infrastructure how this can actually be an enabler for us to reimagine resilience.

Resilience is something that is being used as a buzzword now right. So, just maybe 10 years or 8 years before the keyword was sustainability, but now the buzzword is resilience everyone is using resilience like psychological resilience, social resilience, psychological resilience, the resilience in every form. So, any discipline you know people coming from the architectural background, historians, climate scientist everyone for everyone resilience has become such an important word, but what resilience is so far as urban ecological scapes are concerned that is something which is very very important you know to discuss and understand. So, here in the last part I will be talking about infrastructures and why it is important to rethink in infrastructure to reimagine resilience by harnessing the existing essential abilities you know that shape urban nature.

So, story 1 if just see the picture take a look at the picture you see here and first of all I must acknowledge I must mention Dr. Dhruvajit Ghosh who was one of my mentors and this is from his book 2014. So, Dhruvajit Ghosh like he is the or was the sanitation engineer and whose name is associated with East Kolkata wetlands because he is the one who had done lot of research on East Kolkata wetlands and making us understand you know the value of this wetlands and what the wetlands actually offered and he was also a very good painter and he used to draw like so many sketches from the wetlands and these sketches are outcomes of his transit works and of his you know hours and hours of spending time

in the wetlands talking to the people observing you know nature closely. So, this is from his sketch and you see the first sketch where you see a woman you see a woman in knee-deep water this is one of the bheries. So, if you go to the wetlands if you go to the East Kolkata wetlands during noon hours during the afternoon you will see and this is a common site you will see woman in knee-deep water and what are they doing they are actually collecting snails from the bottom of the pond from the pond bed.

And then these women carry the snails and sell this snails to someone who is sitting at the at an office on the bank of the wetland and this office in the local dialect in the local language it is known as Alaghar and the women then selling the snails to this man to the person in the office and then they also get a payback from this person. And then the snails are collected I mean are collected at the Alaghar and crushed and this crushed snails are used as feed you know as duck feed. So, they are fed to the ducks and you see this paddling ducks on the bheries and the droppings of the duck also become a very valuable source of food fish feed source of food for the fish. So, just imagine you know the circular ecosystem attributes that are beautifully there that are beautifully embedded within the socio ecological tapestry of the East Kolkata wetlands.

This is story number 2 and this is the story of water hyacinth. Now and the of course, the local use of water hyacinth to prevent bank erosion I will explain it and this again I like this picture I owe it to Dr. Dhruvojoti Ghosh, but then one of my students Sharnadeep Bhattacharya he like he redraw the picture to make it a little more vibrant added some colors to it. So, you see here what happened is that the fishers they were actually facing challenges with erosion you know because what was happening was that in bheries that is sewage fed ponds. So, bheries which were like which are a bit bigger which are a bit bigger like 20 hectares or even more then you know the problem is that the waves the surface waves it dislodged the soil the soil you know embedded to the natural grip and kind of it was and provided some like how do I say like the embankments were I mean embankment were not strong enough to fight against this the currents of the waves. So, what could be the ideal solution and the solution actually came from the locals themselves.

So, the solution was that the energy or the current of the waves had to be stopped and the waves had to be dismantled before the waves could reach the shore. So, what did they do? You know you can it is I think one of the best innovations and examples of you know local technology and where you see that they are bamboo poles, two poles you see at a distance of like roughly 3 to 4 meters these two poles they were inserted at the bottom of the pond and in between you see like a fence, fence made of galvanized ironware and of thickness roughly again 3 to 4 millimetre and what is there on these fences on this fence. So, you see water hyacinth again which is available in plenty in the bheries in the sewage fed ponds. So, you see how the locals had arranged water hyacinth on the iron fence and then the waves entering into this area you know actually getting dismantled losing energy and

that is how and that is why the embankments are protected. This is the way this is a mechanism through which embankments are protected here and this is one of the very important you know local innovations through which they had now you know provided the solution to embankment erosion to bank erosion for more than 7 or 8 decades.

This is the last or the third story, the story number 3 and this is about cow dung and cow sheds. I will be happy to know that we now have another very small, but quite exciting you know action research project where we are actually using or we are we would like to understand the wetland story from the prism of the cow dung you know and why is this cow dung so important because you know number of the interviews that I had taken with the bheri own some of the bheri owners, some of the bheri workers, cooperative members. They pointed out about you know to them cow dung it is very very valuable because I and when for example, the secretary of the of one of the cooperative bheries he narrated first time I listen to the story of cow dung from him and when he narrated the story he became so passionate you know about it and I because it was quite like evident from the from his gestures you know and his voice modulation and things like that. And even there in the next week you will also learn about you will learn about you know like this Boro Choynabhi cooperative bheri and you will also meet him you will listen to his voice and his aspirations his ideas about the wetlands the some of the video footages would be shown because we have indeed a case study on the on this particular cooperative. So, from him I could listen to the story of cow dung where he said that you know when he was young then he could actually smell the cow dung coming from the waste water canal and entering into his bheri.

And when he was narrating this story he said that you know beautiful smell of the cow dung and why is it beautiful beauty is so relative it is beautiful to him because or to the other fishers because you know cow dung is a rich source of you know fish feed it is an organic manure and which provides nutrients you know to the waste water. But then he said that now no more we get cow dung or that quality of cow dung and because and I when I asked him the reason that why is this so he says that because Kolkata you know how many cow sheds do you have how many cow sheds are left in Kolkata. And then I really I also try to resonate I also try to remember and I could remember that when I was young for example, I was a child then there were so many cattle shed so many cow sheds in the city itself. But you know there is history that had led to the lake you know I mean this there had been also banning some banning activities as well. So, we really do not have so many cow dungs in the city there I mean they can be counted in some parts of central or northern Kolkata north and central part of the city.

So, what is happening is that there has been a change in the quality of the sewage water from organic to inorganic. So, from cow dung to plastics like because the use of these

materials had increased so much in the last few years. So, for example, soap packets and inorganic soap waste shampoos detergent so many other things and honestly speaking you know they all of these varieties of waste are very harmful you know for the wetlands. But on the other hand one can imagine the power of the cow dung so far as a quality of waste water is concerned and so far as the growth and nourishment of the fish is concerned. And it is you know all I mean I think these three stories they totally put forward these very strong and important argument that why should we understand and perceive East Kolkata wetlands as a keystone ecosystem right?

And here again I explain this concept of WEB. So, WEB can be considered as an acronym and the like if I expand this acronym then I get for example, weaved embedded belongings. And I would like to use WEB as a conceptual analytical traction to you know to bring to the fore the entangled embedded relationship between the city and her wider environments in the form of wetlands in this particular case. So, then how should we understand EKW? So, I think EKW should be understood as a very complex system as an adaptive system. So, complex and adaptive living systems infrastructure evolve over time across an intersecting array of technological apparatuses and social arrangements through constant interactions and also intra-actions.

I will explain what interaction is apart from and along with intra-actions what is interaction between human and non-human actors. So, yes if we really want to understand EKW we should not understand it is a separate ecosystem, but we should understand it as an entangled embedded system within the larger you know socio-ecological tapestry of Kolkata you know as a whole as a delta city as a delta urban space. And we need to understand EKW as the living system infrastructure of Kolkata which is evolved across space and time and along intersecting array of technological apparatuses and social arrangements and the interactions dynamic interactions between human and non-human actors. And you see the picture here this has been produced by Grit from SMUS and you see like everything you know this is actually also you see the is. So, it is again kind of a combined image which provides an imagery about the lakes of Bangalore yeah.

So, like yesterday's this the video footage are already here you will find parallels you know between the video footage and this image and this is EKW is Kolkata wetlands you see the fishes here catching fish and then the sewage water coming from the municipal canals and then on the other hand you also see the threats of you know hyper urbanization how like real estate is coming up in this in the eastern part of the city and so, this is part of the dangers posed by speculative urbanism. Now you already know now about the extensive and the elaborate canal network or canal system of Kolkata and how and why did this canal system actually evolve right. Now I will take you further deeper because this map again if you see you can you will immediately remember you know the other maps that

you had seen in the last lecture. So, this is Kolkata and this is like you know the river Hoogly and this is the so, Adiganga Tolly's canal the other canal networks are here Kestopur canal and you know circular canal and all. And then the major dry weather flow canal then finally, you know interconnected to the Kulti lock and in between we have this wetlands right.

So, you already know this story now. What is very important what is new that I will offer here that you have not seen in the previous map is the map here at the right side in yellow color. You will see like small small inlet canals you know and this small small inlet canals they draw the waste water from the main dry weather flow canal over here. So, this is the dry weather flow canal municipal canal main canal sewage carrying canal which carries the sewage till up till the Kulti river and the Kulti lock is there. So, what happens is that I told you before that in between you know actually it is not only the fishers, but it is an it is a collaborative attempt of the department of fisheries then previously the Zamindars were also there, but now you see the fishers and you know the water user associations.

So, there are like complex social arrangements over here and you have to understand that you know that is why and that is how this technological apparatuses can function properly. Because technology is not apart from you know technology is not something which is not part of society, but rather technology is part of you know social decision making technology is. So, that is why you know we try to analyze and understand everything today from the perspective of STS which means Science Technology Society Interconnections right. So, there are arrangement there are social arrangement there are this waste water user associations and there are you know the cooperative members there are fishers role of gender is also there. So, you see small small small small inlet canal then you know carrying the waste water from the DWF canal and feeding the bheries the sewage fed ponds and that is how you know pisciculture again is facilitated in the bheries and that system is also complex where you see that how waste water enters and reaches from one pond to the other.

So, which are known as waste stabilization ponds and then the final outcome is actually fish and also the final outcome is purified water then sent back to the DWF canal and now the DWF canal carries waste water which is far less in terms of their BOD COD load and then better version of water or wastewater actually or purified water to an extent it reaches the Kulte river. So, this is such a fascinating you know an intricate drainage sewerage wetland system. Yes, so the final part of this presentation where you know I already told you in the root map that this is something which we really need to focus a lot. Everyone and everyone interested in urban ecology coming from architecture, coming from planning, coming from you know development studies background need to really think about this. I was highly inspired you know by this article by Stephanie Carlisle who is an

environmental architect and she wrote this article called Productive Filtration Living System Infrastructure in Calcutta and you understand now that how I have borrowed you know this concept and called it living systems infrastructures right.

Just take a look into the image I think this is very very powerful where you cannot really you know segregate and differentiate the elements, but you also see that there are many elements together. And you read the argument put forward by Carlisle where she says that and this is one of my favorite you know quotations or rather you know arguments. So, Carlisle says that resilient adaptive infrastructure cannot be built. So, beware you know the engineers, the architects do not try to build a resilient infrastructure because resilience is embedded it is there it exists whether you are able to see it or not you know it actually exists. So, a good engineer, a good architect will be focusing you know this on this nuances on this existential essential you know nuances that actually I mean that actually kind of make the city resilient from below.

So, there is no need to plan and to impose and transplant you know resilience from above it does not work it does not work like that. So, she says that it grows slowly, but extensively building up relationships in steps and bounds integrating into surrounding systems flows and entities. It evolves and shifts till it is essential and invisible such a beautiful you know understanding from the urban ecology perspective. So, and that is why you know my final words are actually that what does seeing and hence envision like an urban ecologist imply. First as I mentioned drawing from Carlisle and several other you know social sciences discourses, but also you know architectural and urban ecology discourses that resilience cannot be transplanted and it cannot be planned you know it cannot be planned and transplanted from above.

If you are doing this we are making a mistake and that is why you know all these schemes such as blue, green, gray infrastructures unfortunately they I mean they do not work always as they are planned because you know they are capital intensive power laden you know structures that unfortunately do not recognize you know the embedded the integrated existential essential attributes that are already there. So, that is why you know explorations of and immersions in the essential abilities of more than human interactions are needed. So, what do we what do I mean by this I have taken it from Barad. So, Barad had talked about interactions apart from and along with intra-actions. So, in interactions what is the difference you know between the two we need to understand is what is the difference between interaction and intra-actions.

So, in interactions it is still the pre established you know entities who tend to participate with each other, who tend to interact with each other and is through some actions, but in intra-actions it is I mean weightage is not given to the agency of the individuals or entities

who are willing to interact, willing to participate and interact in actions. So, that is what the like weightage is given on the dynamic forces that make this interaction you know like possible or that actually make this intra-actions inevitable. So, that is what intra-action is all about. So, why do we need to understand and nurture this perspectives because we have to co-create designs it is not only the human agency, but it is also the agency of the non human actors you have seen the power of the cow, you have seen the power of the snails, you have seen the power of the you know water hyacinth and you have seen how the localities they are also invested in this part and how you know all these arrangements are to a great extent is also about celebrating you know this non human intera-actions. So, it is called the weightage is a fascinating socio technical environmental you know exemplary example that I think establishes this notion of intera-action and this notion of you know resilience exist existential and you know essential resilience that is already there part of as part of the urban ecological tapestry.

So, is thus important to co create designs to facilitate existing essential existing existential and essential attributes co constituting urban nature. These are reference the references and you know all these names are there current Barad, Carlisle and Dhruvajoti Ghosh's book from where I have used those beautiful sketches, sweet sketches and then this is the book again blue infrastructure, but I would recommend you to read these two articles you know as much as possible with lot of focus. So, the one by Carlisle and the other by me and in both you find this as common living system infrastructures and very interestingly our case studies are also the same. Carlisle also had worked on East Kolkata wetlands, I also had worked on East Kolkata wetlands. Carlisle comes from the background of architecture, I come from the background of environmental history and political ecology and then you see that our conversations.

So, Carlisle lighting in 2013 and myself you know developing this concept further 9 years later 2022 and you can actually try to make a comparison between the two. So, conclusion the three snapshots the Snail story, the Water hyacinth story and the cow dung story from the EKW from the East Kolkata wetlands demonstrate that this socio ecological system is an adaptive living system infrastructure evolved within space time cultural context across an intersecting technological apparatuses and social arrangements and constant now here I add intra and interactions between human and non-human actors. The understanding of long-term urban ecological inheritance you know it is where heritage matters is imperative to see and envision like an urban ecologist informed by WEB you remember WEB right weaved embedded belongings and not engineers and planners transplanting designs from above.