Water, Society and Sustainability
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Lecture - 07
Critical Physical Geography (CPG)

So, this is the sixth lecture on a Critical Physical Geography, which is another theoretical framework which can be applied to study river systems, river basins and water. We had already covered socio-hydrology and hydro social. So, if you remember that one of the major criticisms of social hydrology is that, this socio-hydrologies they put lot of emphasis on quantitative modelling. So, they try to do a quantitative modelling in a rigorous manner and that sometimes you know fails to capture the complex social realities.

So, the argument is that the critics argue that this quantitative modelling cannot always capture social realities that are invoke in river systems or for that matter in you know different kinds of water multiple waters or water bodies. So, while socio-hydrology is criticized you know due to its shear emphasis on quantitative modelling, on the other hand one of the major criticisms of hydro sociality or for that matter political ecology of water is that in it you know ecology or the physical and the technical aspects take a backseat.

So, within this context critical physical geography it provides us with an opportunity to strike a balance between both physical aspects and social aspects. So, it is such a field that actually you know provokes us or that calls forth for an integration between physical and social aspects and also between the scientific and political.

So, in that way it is a very radical you know research framework you know that the geographers are trying to evolve it. And just before I start the start the major points that are covered in this lecture I would just like to say that as it is a very recent an extremely recent conceptualization. So, I will not be in a position to you know to make a detailed closure statements, but I will be in a position to explain.

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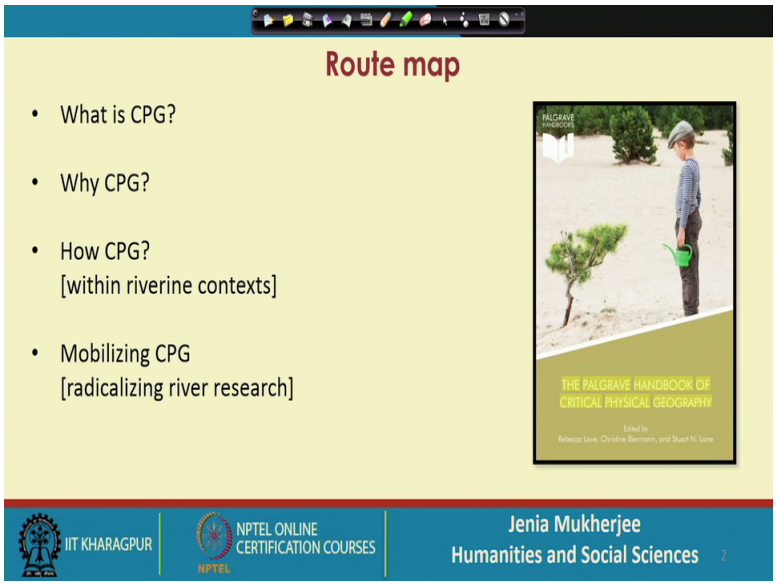

What is a CPG or Critical Physical Geography? Why CPG? So, why it is important for us or why you know CPG can be a very significant and vital theoretical framework to understand a river systems and water. How critical physical geography and here I will be able to you know site some examples from some of the recent works that had been conducted by through by where the geographers had applied the lens or the methodology of CPG.

And finally, I would like to end this lecture with my opinion or my take on why I think that, CPG can be mobilized within the South Asian a context and why you know it is a very a significant tool through which we can also radicalize river research. So, this is the route map for this lecture.

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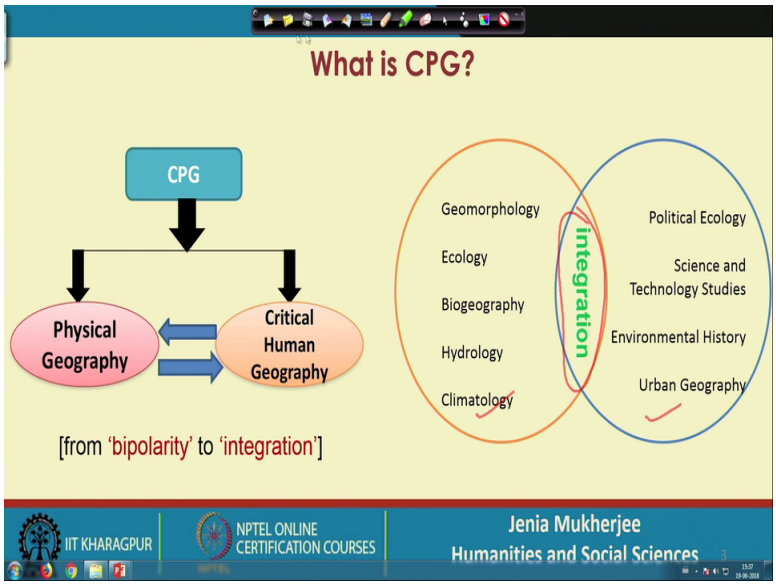

Now, to begin with what is CPG? So, actually geography the discipline of geography was broadly classified into 2 major domains, one is physical geography and the other one is human geography.

And unfortunately you know seldom these 2 domains used to converts between each other. So, geography discipline was bifurcated between these 2 streams or 2 domains. So, this is what is known as the bipolar syndrome in the discipline of geography. Critical physical geography is the development or the recent development within you know geography which says that, there should be an integration between physical geography and human geography so, the both should depend on each other. So, it should be a kind of a you know mutually interdependent relationship.

So, critical physical geography it is a one step ahead and this is a very vital step which you know calls forth which calls for you know from bipolarity to integration. So, what we find in critical physical geography is that both there should be a lot of emphasis on both the physical and the, you know you human geography elements. So, to elaborate on that critical physical geography you know provokes us or it argues it shortly points out that there should be whole lot of not only exchange, but also integration.

So, there should be whole lot of integration between geomorphology, ecology, biogeography, hydrology, climatology on one hand and political ecology, STS that is science and technology studies, environmental history urban geography on the other. So,

what is important in critical physical geography is that, there has been a transformation there has been a you know. So, it is a kind of transformed trajectory from bipolarity to integration.

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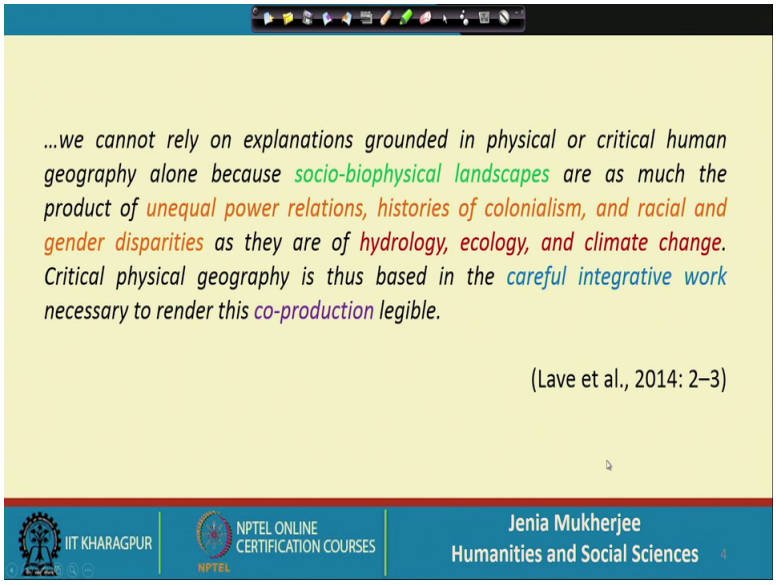

This is the quote from Rebecca Lave's paper published in 2014 and this is a very significant you know remark by Rebecca Lave and it is a very comprehensive argument put forward by Lave who is one of the critical physical geographer of the contemporary times and Lave says that we cannot rely on explanations grounded in physical or critical human geography alone.

So, the point that we are just raised in the previous slide that is there should be whole lot of integration between the physical aspects and the human geographical aspects. So, she says the same thing that we cannot rely on either this or that alone also. So, these 2 should not be treated as separate units of analysis, but this should these 2 should converts you know this should 2 should intermingle and combine and there should be whole lot of integration across technical physical aspects and social political aspects and human geographical aspects as well.

So, at why this integration is important. So, she tries to explain the reason behind this. So, she says that this you know the integration is important because socio-biophysical landscapes are as much the product of unequal power relations, histories of colonialism, racial and gender disparities as they are of hydrology, ecology and climate change.

So, this is a very significant comment where she says that you know landscapes so, when we are looking into a landscape. So, for example, a geographer the way he would look into a landscape would be very different from how an architect would look into a landscape as. So, the way an architecture would perceive a landscape would be very different again from you know someone doing or practicing or pursuing environmental history.

But today if we want to come up with you know solutions, if we want to provide management solutions for a particular landscape that is undergoing some challenges or some risks or whatever, then the argument is we cannot solely rely on the expertise or the skill sets of any particular expert coming from a particular disciplinary background.

So, now, today's era of Anthropocene and the kind of social and environmental changes that we are encountering today that provoke us to not to you know provide solutions from only singular units of analysis, but from plural unit of analysis. So, this what Lave talks about that socio physical landscapes, they are the products of power relations colonialism gender disparities as they are the products of the physical elements like hydrology, ecology, and climate change.

And the Rebecca finally, argues that critical physical geography is thus based in the careful integrative work necessary to render this co-production legible. So, co-production so, we had already talked about integration. So, now, she is talking about a co-production another sophisticated research term. So, how you know these methodologies or methods or techniques across this disciplines together can co-produce with you know co-produce and help us to identify the challenges and potentials associated with particular landscape or waterscapes or other you know ecosystem resources.

Yes so, now, we will discuss about how CPG had actually evolved, it is still evolving of course, it is a very dynamic field right now, it is very recent as I already mentioned and it is definitely in a in a dynamic way it is evolving, but then let us who the historiography exercise and little bit as we are done it for the other lectures as well for the other theoretical framework. So, now, if we try to sketch the trajectory or the journey of CPG then we will find out that.

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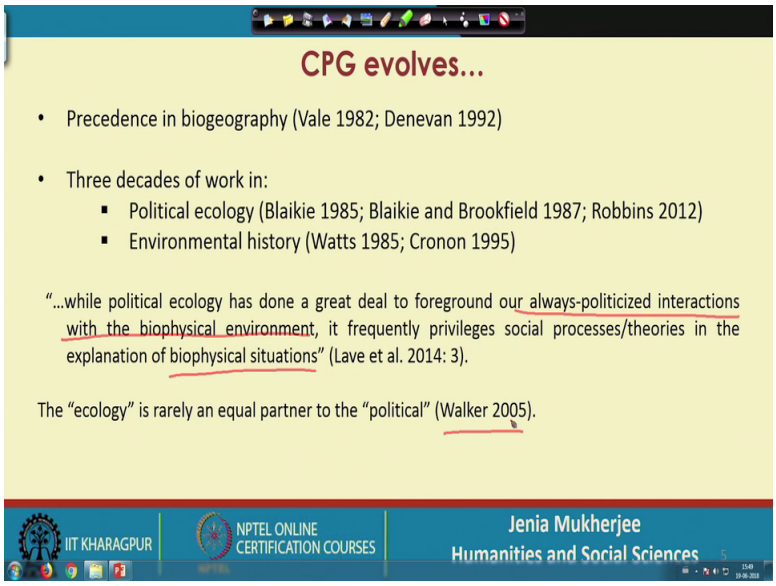

CPG actually find this precedence in the works of biogeographers, specially I can just you know talk about 2 cases one famous work and it is cited in the reference section by Thomas Vale and the other work by William Denevan. So, they are the biogeographers and Thomas Vale his path breaking argument was that he said that you know the goodness. So, the goodness quote and quote goodness or the quote on quote badness of human alteration of vegetation if you want to you know access or if you want to evaluate the goodness or badness of human alteration of vegetation.

Then even not only find your answers in the ecological effects per say, but you also need to explore the human values, ethics, morality, behaviors and all these elements that play vital role in the alteration of vegetation. So, he talked about human values he talked about ethics so, he brought in all these you know otherwise so, called softer elements we so, and said that these elements are also important for us to evaluate or access the goodness or badness of human alteration of vegetation.

So, this was his argument long back in the 1980's, then there is another work by William Denevan and William Denevan he also critically rewrite the sources to explode the myth of you know pristine so, called pristine American violence. So, if you are interested the references the full references sited in the reference section, you can just take a look if not the whole article or the entire work you can only go through the abstract or the highlights

of this major works to get some idea about how the biogeographers already were talking about a social science a parameters as well.

Now, to be more specific if we want to trace the journey of a critical physical geography it will not be erroneous it will not be wrong to say that a critical physical geography is actually 4 shadowed in 3 decades of war in political, ecology and environmental history. So, political ecology we already know political ecology by now and so, political ecologists and environmental historians both these scholars I mean who started pursuing, started practicing political ecology and environmental history.

They had actually combined rich archival sources and political ecologists mainly you know ethnography. So, detailed ethnography detailed field work they had done and they had helped us to highlight and to understand things which are otherwise not that much visible. So, for example, I mean there are numerous works by the political ecologists and these are some fundamental books on political ecology which tells you about, what political ecology is all about, the methodology and all that.

For example, Paul Robbins book these are you know kind of handbook and all that so, political ecology for example, there are very interesting works which show us that for example, if you want to understand African draught ok. And the if you want to study pastoralist response to the draught, then you know only a technical assessment of that particular physical phenomena would not capture the entire picture.

So, you cannot do the research from the even headquarters you cannot get the entire view from satellite images. So, what you need to do is that you have to do rigorous and detailed; you know ethnography, field work, to capture the regional specificities. So, this is what the political ecologists had made us understand. So, for example, there are the very interesting works for example, I can just remember the work of Zimmerer during the 1990's where Zimmerer shows that how I mean soil was eroding in Bolivia due to the depopulation.

So, these kind of an argument it is; it challenges Malthusian assumption, where we only tend to think that if the population increases then only soil fertility will decrease, but Zimmerer has showed through her you know research detailed empirical research that in Bolivia soil erosion or soil fertility I mean soil fertility decrease or soil erosion occurred due to depopulation.

So, regional specificities regional variables are very important components which with which the experts or the scholars need to get a custom to understand what is actually going on in a particular field. Similarly environmental history also we have multiple works we have works by I mean so many historians are there and in the next couple of lectures we will get to know more about environmental history, more specifically environmental history of South Asia, India and there you will see that how environmental historians had also combined you know archival research methodology and field research to come up with you know ideas which were otherwise quite unexploded you know so, far as changes or degradation of ecosystem resources were concerned.

So, again another significant remark from Rebecca Lave's article or paper; so, where she says that the political ecology, environmental history these are all important you know fields of analysis. So, more important is focusing on political ecology Lave's says that while it has done a great deal to foreground our and this is important, always politicized interactions with the biophysical environment it frequently privileges social processes theories in the explanation of biophysical situations. So, the argument that we had already that I have had already made that you know one of the reasons criticisms of political ecology is that I mean though it is emphasizing lot on politics.

So, it is able to make us understand the politicized interactions within the biophysical environment, on the other hand the problem is that ecology or the physical aspects are actually taking a little back seat in political ecology. So, the same thing Walker also pointed out in 2005. So, the ecology is really an equal partner to the political.

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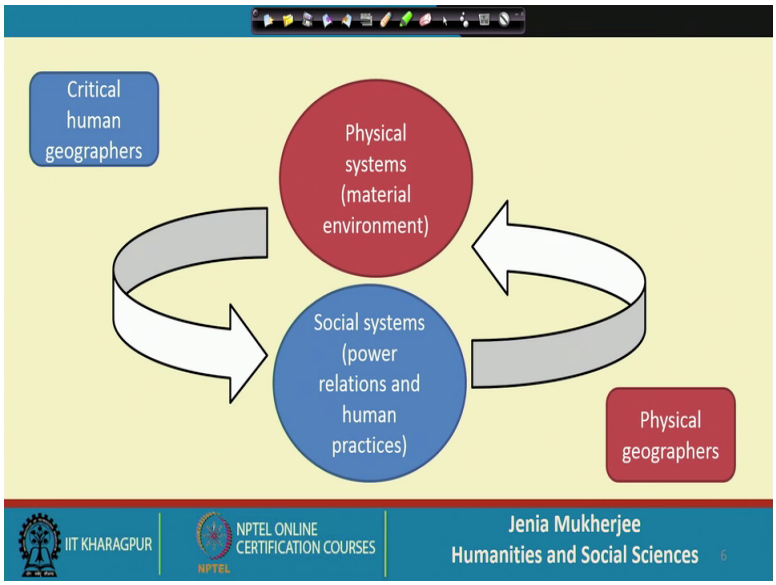

So, within this context, critical physical geography is an important framework why, because it requires critical human geographers to; it requires this critical human geographers to understand you know the role of the physical systems or the importance of material environment in shaping social systems.

On the other hand it also you know engages physical geographers and you know engages physical geographers and make them exposed to social systems to power relations and human practices and the physical geographers they tend to understand that why and how power relations and human practices actually determine physical systems and not only the physical system, but also their own you know researches. So, this is why physical critical physical geography is such a vital tool it is such an important methodological framework you know for both human geographers and also for the physical geographers

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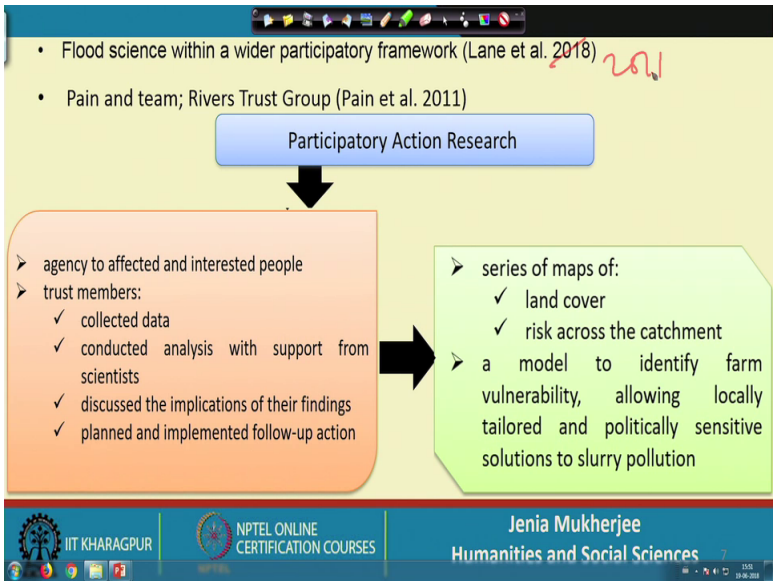

So, now, I am going to discuss one or two works, I mean where these scholars had applied the lens of a critical physical geography in order to; so, that applied this particular lens. So, far as river basins or river systems are concerned there is a wrong cited. So, it is a Stuart Lane's paper which he developed in or which he published in; he Stuart Lane and his team they published in 2011 so, it is not 2018. So, you will have this list in the reference section. So, in the list you will have the reference as well.

So, there are many works you know in the recent decades Stuart Lane and his team from the University of Lausanne and you know other parts of Europe they had worked a lot on a river system and river science and more specifically flood science and they have come up with numerous papers and I have cited few papers here. So, this particular paper on flood science is by Lane and his team which was published in 2011. So, Lane and his team and similarly it is a same year Pain; R Pain and his team in collaboration with the English Rivers trust group, they also you know came up with a publication in the same year 2011.

So, this 2 works I mean the contribution of this 2 works of that of course, they had applied critical physical geography lens or a critical physical geography as a methodological framework and they tried to see that how you know how knowledge about flood risks can be co-produced by both the scientists who have technical expertise in the field and also the so called (Refer Time:21:07) local (Refer Time:21:10) who are

either interested about the whole phenomena or who are involved or affected you know by this change.

So, both of them had done the same thing and for example, R Pain and his team as I mentioned in collaboration with a rivers trust group, they had applied what is known as participatory action research. So, this is nothing new so, we all know what participatory action research is all about. So, what they have done is that they asked the people who are interested, who will be interested in this particular research with them. So, either people who are affected by the change or people who are who wants to wanted to get involved in this research. So, they asked this people to participate in this research with them.

So, what was the issue all about, the issue was that slurry was getting discharged in a particular river and due to which the health of the river was deteriorating. So, it will be a fascinating exercise for you if you can really go through this particular a paper cited in the list of references. So, we will see that this particular issue when slurry I mean the river's health was deteriorating due to I mean slurry and due to switch in the river.

So, they try to access like and they try to measure access evaluate the condition of the entire stretch and they also wanted to do some kind of risk assessment ok. So, they asked the affected and the interested people to you know to get involved in this whole research. So, what the trust members did was that, the trust members they collected the data they conducted analysis with support from scientists and they also discuss the implications this is very important, discussing the implications of their findings with the larger audience.

And this was followed up by planned and implemented follow up action and so, what was the outcome. The outcome of series of maps of land cover, risk across the catchment and they could also co-produce a model to identify farm vulnerability. And most interestingly it allowed locally tailored and politically sensitive solutions to slurry pollution, because if only the scientist would had been involved in this exercise then you know maybe politically sensitive or locally tailored this 2 things are very important, locally tailored and politically sensitive.

So, what I am trying to argue is that as Pain and his team had shown us that you know if they would have only involved the scientist and technoperts for that matter only the

experts, then or even only the scientists and the policy makers, then they would not be in a position to deliver politically sensitive and locally tailored solutions. So, politically sensitive and locally tailored solutions they could only you know they could only come up with to deal with slurry pollution in the river. Because they involved affected and interested people in this research and they gave agency to them. So, this is a very you know an appropriate example of how participatory action research is done.

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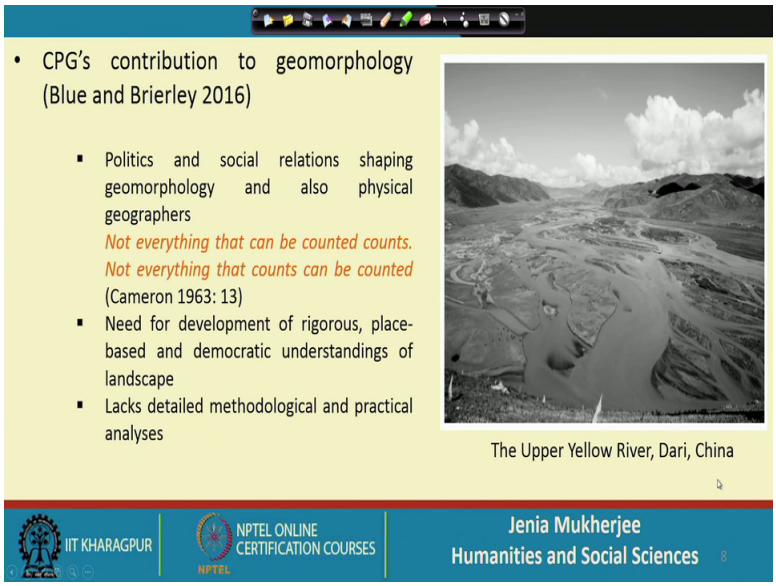

So, again another important aspects so, these are only very few works that are being conducted very recently you know I mean applying the lens of critical a physical geography. So, Blue and Brierley 2016 they tried to look into the contribution of critical physical geography to geomorphology. So, how a critical physical geography can actually contribute to geomorphology?

So, the argument is like just as the particular river is a product of its valley, similarly geomorphology shapes and it is also intern shaped by the world around it so, this is the major argument. So, for example, Cameron remarked in his 1963 war that not everything that can be counted counts and not everything that counts can be counted. So, I can just elaborate this remark by an example, the example of this particular river the upper yellow river in Western China; Dari in Western China. Now the argument is that like how can you actually access or how can you actually measure river geo diversity.

So, what are the attributes you actually need to measure, in order to access you know river geo diversity and why would you actually I mean why would you take those parameters and those attributes only. So, these are the things which need to be a critically looked into and answered. So, for example, these particular river in Western China it has a transitional form like you know these students are experts from geography, I mean people with I mean coming from the discipline of geography they will understand that these river actually it has a kind of a transitional forms between what is known as the braided form between what is known as actually the braided and the anabranching morphology.

So, this is a transitional form and so, why I am giving these examples I am giving this example because generally braided and anabranching morphology they have different you know process associations. So, it is quite exceptional that they will remain in the same stretch, but here what is happening in case of this particular river that both is braided and the anabranching form I mean transition between these 2 forms are available in this particular stretch of a river.

So, these kinds of rivers they will actually make us understand they help us understand the fact that we cannot implement normal. So, called quote unquote you know normal classification or universal, normal classification model across every river. And these transitional form enable us to understand that you know we will actually come up with in appropriate management solution if we start having a particular expectation from a particular I mean from river characters and behavior.

So, that is why different rivers they have you know different attributes and it is very important for geomorphologies to remain aware about these different attributes. But so, what I will argue finally, is that I mean these are still a works in progress and we need I mean rigorous place by then democratic understandings of landscapes; yes this argument has already been established and more and more empirical investigations need to be carried out because still it lags detail mythological and practical analysis, but at least you know the framework is evolving well, it is coming up well and the framework is very dynamic. So, you know I mean it is an exciting opportunity for all of us to really get plunged into this particular framework.

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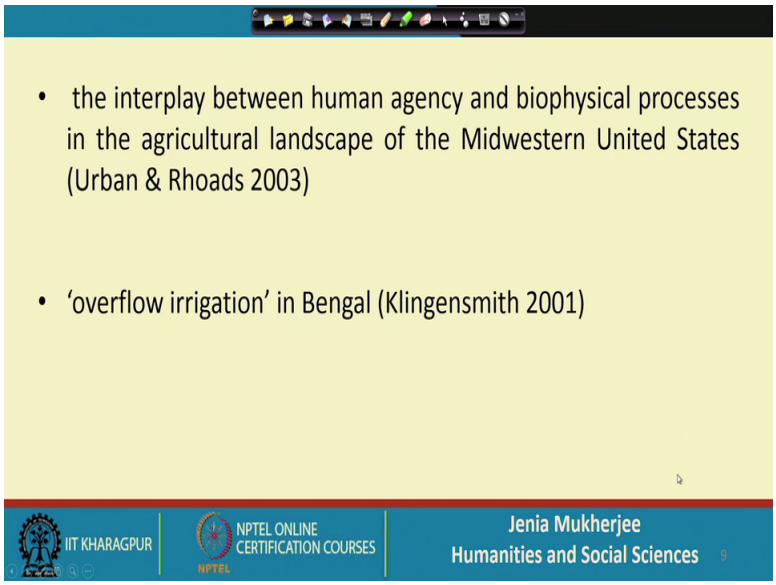

Yes so, just one or two more examples so, one particular work by Urban and Rhoads 2003 work where they tried to you know see the sudden interplay between human agency and biophysical processes in the agricultural landscape of Midwestern United States. This is another fascinating example where Urban and Rhoads they deal with the case study which shows that you know in this Midwestern United States landscapes the farmers they actually wanted sustainable agricultural production.

Of course, you know there were economic imperatives a behind that. So, they wanted sustainable agricultural production in the seasonally wet and poorly drained landscape. So, what they did was, that they made the; extend is they you know made the extend streams viable and they channelized I mean extended drainage channels to the otherwise unchannelized part of the landscape. So, what happened was there.

So, we can see here that human beings they became agents of geomorphological change and the outcome was you know agricultural homogenization or simplification for that matter where habitat I mean the habitat complexity I mean things associated attribute associated with habitat complexity it lost ground and it also I mean had some impact on the integrity of the fishing communities.

So, Urban and Rhoads they argue they demonstrate that you know though land drainage might appear to be very simple and though anthropogenic change might appear straight forward, but it is very important to understand that land drainage also, it comprises of a

lot of you know social and cultural aspects and sometimes the identity of the farmers and not sometimes I mean in most of the cases as these are formed for a long period of time as these operates for a long period of time function for a long period of time.

So, the farmers their identities are also to a great extent associated with this kind of you know land drainage systems and I mean techniques and mechanism. So, it is very important for us you know if you really want to come up with sustainable and viable you know drainage solutions. Then we need to consider these social and cultural aspects across long temporal trajectories.

So, these brings me to this makes me remember of you know overflow irrigation in Bengal. So, we will cover about I mean we will talk about overflow irrigation in detail when we will be talking about water management practices in Eastern India during the ancient time and also during the colonial time. And how actually Bengals overflow irrigation I mean it was replaced by the colonial perennial irrigation system and what harm is actually did to the environment and society at large.

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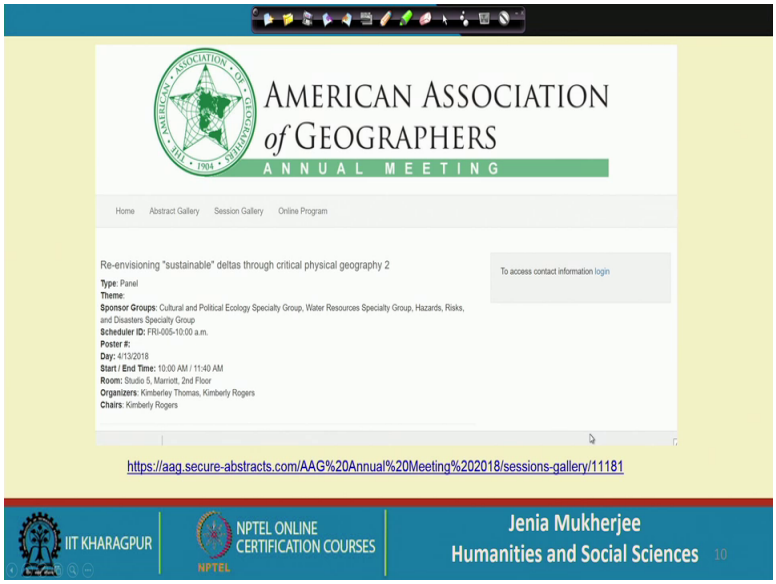

So, finally, so, as I mentioned that it is an ongoing very recent dynamic field you can see from the dates. So, this panel a very exciting a panel, re-envisioning “sustainable” deltas through critical physical geography, that is applying physical critical physical geography to understand deltas ok.

So, this panel it was organized very recently 2018, I think in the month of April and so, it was a panel which was organized the annual meeting of the American Association of Geographers we are yet to receive the full papers from this panel, but you can just click this link and go to the concept note.

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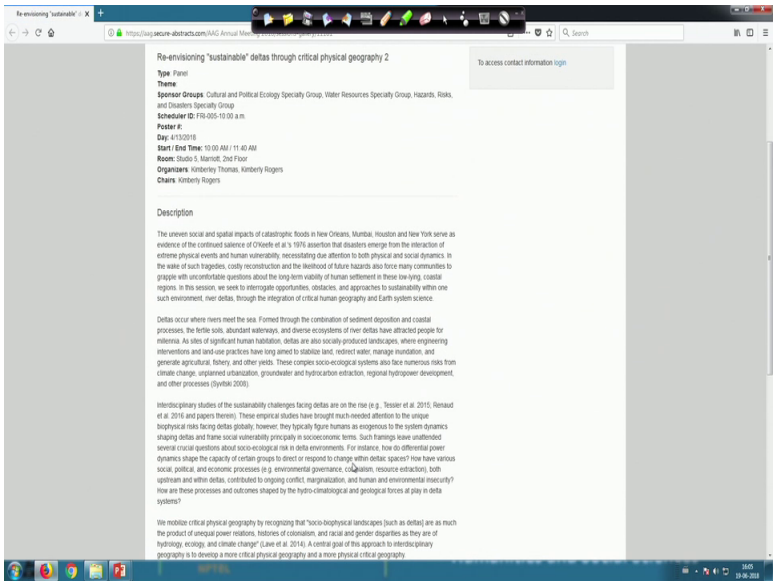

And you will find out that how in the concept note or how in the description it is said that, these deltas these are these are you know these I mean these are not only physical landscape, but these deltas are also socially produced landscape. So, this is the major arguments that is there in this in the description and it is I very much hope that it was a very exciting panel and we are yet to receive the full papers, but very much hope to receive and read the full paper soon.

And so, we will be able to understand how critical physical geography can be applied to study deltas, not only you know in specific deltaic estuarine areas, but you know across the world cross floodplains how deltas can be studied I mean and how deltas can be perceived from the lens of critical physical geography.

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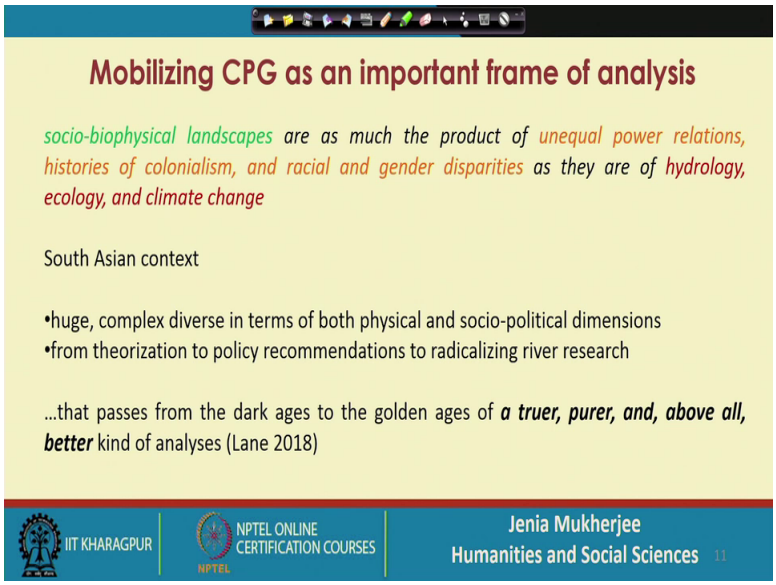

So, the final slide on I mean how and why I think that mobilizing critical physical geography can be I mean critical physical geography can be mobilized. So, far as South Asian context is concerned because South Asia is a it is we already know by now I mean South Asia is a very huge and it is a complex and it is a diverse context in terms of both physical and socio-political realities and dimensions.

Because South Asia had encountered colonialism, South Asia I mean it is a very diverse context and where we also had a these pre colonial management practices practiced by indigenous communities. So, I am not going to elaborate this particular thing right now here, but then when we will be discussing in details the case studies relating to the South Asian context it will gradually become clear to us. So, this multiple layers will get you know unveiled and explored that how you know critical physical geography might be an eminent necessity to understand I mean to understand environmental change from a broader from a much broader and larger a prism a larger frame of analysis.

So, another thing is that I mean critical physical geography will also be very important for us to radicalize river research because we are already mentioned that critical physical geography not only integrate physical and social dimensions. But it also shows us the way how to integrate the scientific with the political by not only providing scientific solutions, but today in the contemporary times we also need to really come up with and provide politically sensitive solutions and critical physical geography is an exciting

methodological tool that that actually shows us way I mean how to do this how to pursue this. So, I get a quote from Lane that that passes from the dark ages to the golden ages of a truer, purer and above all better kind of analysis.

So, Lane is very optimistic about this particular frame of analysis and Lane says that you know a critical physical geography is such an important field that it will enable us to pass from the dark age; the age or the era where you know segregation was the norm, but not integration, but now from the dark age of segregation how we can actually move on to a truer purer and above all better kind of analysis through integration.

So, finally, you know critical physical geography I am personally very interested in this and I am also excited about this frame of analysis, because I think it strikes a balance between theory and actions and it also you know strikes a balance between these. So, called analytic and normative because it not only shows us ways or help us understand and justify how the world is, but it also gives us an understanding about how the world or to be.

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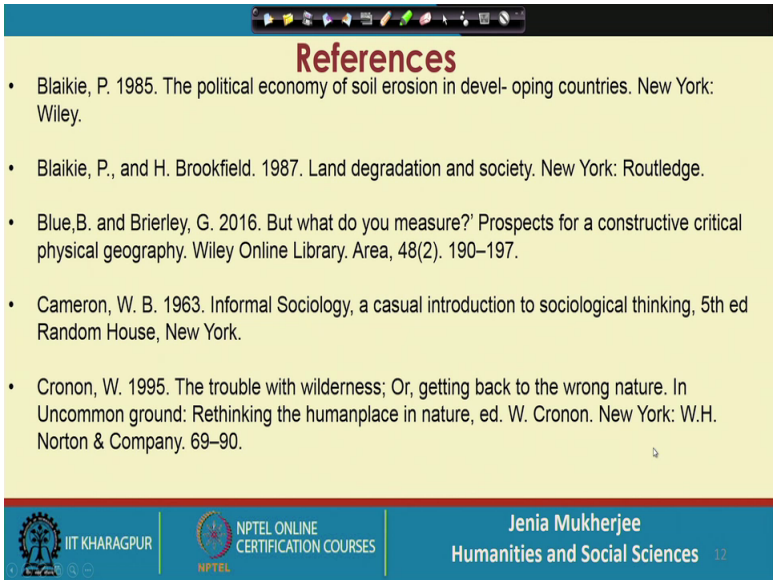

So, with this I would just ask you to go with these references.

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And you can have your budding ideas and definitely we can exchange a lot, you can come up with your queries, your frame of analysis.

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Criticisms whatever and we can have very interesting and integrative I mean interactive exchanges in the online forum.

Thank you.