

**Water, Society and Sustainability**  
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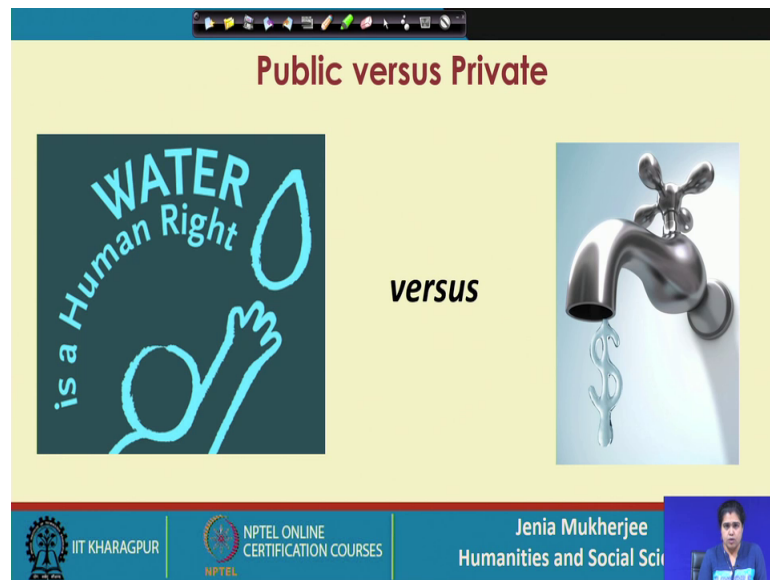
**Lecture- 04**  
**Political Ecology of Water**

So, the fourth lecture would be on the Political Ecology of Water, and the if you remember I covered socio hydrology as an emerging framework, which had been you know conceptualize at being pursued by the hydrologist or mainly you know the natural scientists. So, and I mention that you know there are two major very interesting emerging theoretical frameworks today. So, one is the socio hydrology being pursued by the natural scientist and the other one is hydro social which is being pursued mainly by the social scientists.

So, now before we understand or before we move on to a hydro social, or the hydro social cycle, or hydro sociality, it is important for us to understand political ecology of water. What political ecology of water is all about? These are very important because this is the umbrella concept, this is the umbrella approach of framework from where hydro sociality or the hydro social cycle had actually emerge. So, before we cover hydro sociality before I understand what hydro social cycle is all about; it is very important for us to understand political ecology of water, which is the (Refer Time: 01:27) of lecture 4.

Now, the first question you know so far as the water sector is concerned today is why water crisis is taking place. So, is it due to the natural factors like climate change, or is it you know human induced or then we can complicate the whole question by even saying that whether sometimes you know natural variables, on the natural factors are also loaded with anthropogenic influence.

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So, these are the questions these are the critical or complex questions that will really need to raise, and really need to understand to understand and perceive deeply perceive, water crisis or water scarcity. So, there is a very interesting article written by Barbara Rose Johnston and the name of the article is political ecology of water which is published in 2003, in the field famous journal called a capitalism nature and socialism.

And there Barbara Rose Johnston says that you know today there is a kind of a complicated contradiction between agendas and action that value water as a fundamental human right, and agendas and actions that value water as a private commodity.

So, this clash is very much evident and due to this particular clash Rose argues that we are not being able to come up with possible solutions and we are even not being able I mean we are not being in a position to avoid new crisis or emerging water crisis.

So, this brings us to another very important question that is scarcity real or manufactured or even manipulated at time, what do you mean by whether it is scarcity is real or manufactured.

(Refer Slide Time: 03:16)



**Is scarcity real or manufactured?**

Not an 'apolitical' but a **political** approach!

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So, the idea is like in some of the mainstream discourses we will find that scarcity is explained only in terms of non-availability or lack of availability of resources. But the question is a scarcity only lack of availability, if we say that scarcity is only on availability of resources then actually we are not applying the political lengths.

So, it is a very kind of a linear or political explanation of scarcity, that scarcity is nothing but you know a lack of availability.

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**Quantity, Quality and Access**

**WATER WARS**  
PRIVATIZATION, POLLUTION, AND PROFIT  
VANDANA SHIVA

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Humanities and Social Sciences 4

So, we will go deeper to understand the you know deeper and inner meanings or they multiple layers that are very much there that embedded in the entire issue of scarcity, be it water resource, be it any other natural resources. So, these again brings us to the idea that you know the issue of water is a not only issues relating to or issues of quantity and quality, but it is also the issue of access and also the various, variables, and parameters that are at play that are at work that determine access, and entitlement to water resources.

So, the other day if you remember in the introductory lecture I discussed about the uneven entitlement to water resources in the particular city of Kolkata. So, where we found that you know in Kolkata, in the slums and in quarters the people they are only entitled to even sometimes less than 50 liters of water drinking water per day. On the other hand the a leach people living in the central parts of the city for example central business detritions and all that they can consume a water up to like 150 liters.

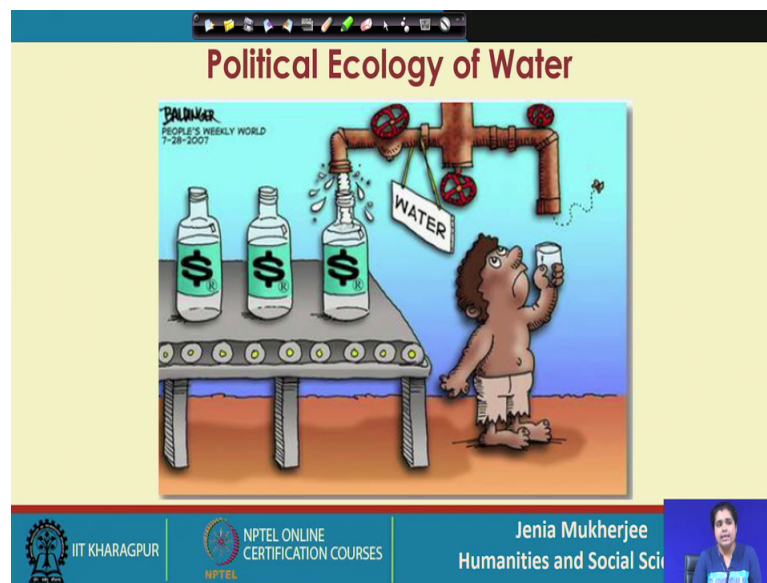
So, there is a huge difference between the level of consumption between the so, called water rich and the so, called water poor people. So, on the other when if we look in the rural sector then also we will find that on one hand while this farmers they are starving, they are suffering, from lack of entitlement or lack of access to water resource for irrigating their fields or you know for some other basic requirements of livelihoods. On the other hand the a private corporations, they are being able to buy water at extremely cheap and affordable prices even sometimes 5 paisa per liter.

So, these problem it has come out wonderfully in this particular book by Vandana Shiva, the book called water wars privatization pollution and profit which was published in 2002, and there Vandana Shiva writes she say says that while in a desert, why on the one hand we find droughts and desertification these are intensifying around the globe; on the other hand you know the corporations the private a corporate capital is there aggressively transforming free flowing water into bottle profits.

So, she says that you know these water was in this particular century the water was would match the oil water even if there is a chance attitudes surpass the oil wars on the previous century. So, she also makes us aware of I mean the historical erosion and corrosion of community, or communal, water rights, and the emergence of corporate culture. So, she says that the need of the hour is that we really so, she actually calls for a movement.

So, a movement that will ensure equal water access to all and she also evolves at a blueprint of global a global resistance, where she draws example successful examples of you know successful campaigns across the world; especially also you focusing in India, what is happening in India? How some of the activist they are also successfully being able to create lot of pressure their being able to pressurize the corporations and the corporate law.

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So, with this background I will say that political ecology of water is a very important and exciting and a viable framework that makes us aware of the unequal and uneven distribution of water. So, uneven distribution of water across class, caste, ethnicity, gender and special lines; So, political ecology of water is that particular lens that important lens that help us capture complexities and you know nonlinearities in the human nature or most specifically human water cyclical interactions.

So now, before we move on political ecology of water it is very important for us to understand what political ecology is all about. And the so, we get an opportunity to learn political ecology before you move into political ecology of water. So, political ecology is a field of critical research that assumes that any tug on the strands of the global web of human environment linkages it reverberates through the system as a whole.

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**Political Ecology**

- any tug on the strands of the global web of human–environment linkages reverberates throughout the system as a whole
- Interdisciplinary; not a discipline but a 'community of practice'
- "the hatchet and the seed" (Robbins 2012)

CRITICAL INTRODUCTIONS TO GEOGRAPHY  
Paul Robbins  
**Political Ecology** Second Edition  
WILEY-BLACKWELL

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So, if there is any tug on the strands of this entire you know this global web of human environment linkage then it would reverberate throughout the system as a whole. Moreover, political ecology it is it does not comprise of methods and methodologies from a particular discipline, but it combines methods and methods of different disciplines of social science is mainly you know and so, the initiative also so, the interventure is inter disciplined.

So, and a Paul Robbins in this particular books; So, Paul Robbins had written this book called political ecology critical introduction and in these book Paul Robbins says that political ecology is not even a discipline, but it is actually community of practice. So, where people coming from various disciplinary backgrounds they are you know their powers in political ecology, but at the same time they are actually raising similar sets of queries across the relationship; you know among politics, economics and ecology.

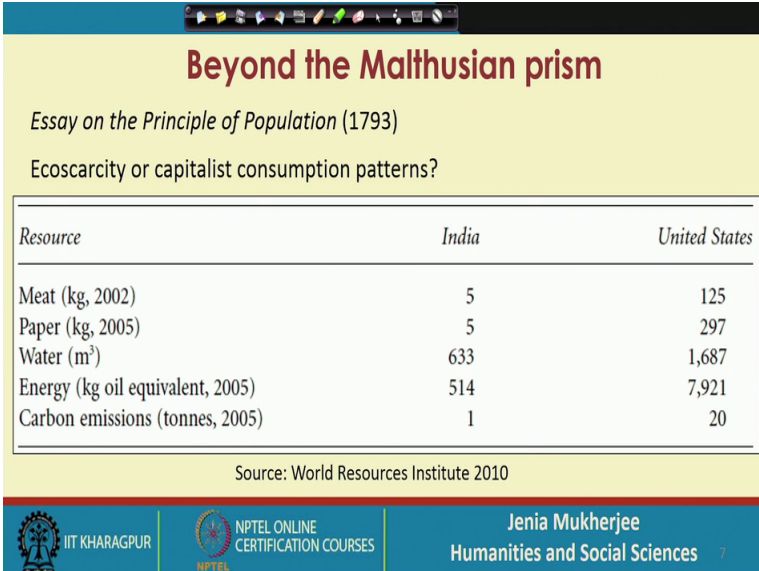
And Paul Robbins also says that you know if he says that political ecology it a presents the Jekyll and Hyde personal you are, I hope you know the story of doctor Jekyll and mister Hyde with you know these personalities or split personality disorder. So, we say that you know it represents this Jekyll and Hyde personal because at the same time it provides both the hatchet and the seed.

So, what is done with his hatchet so political ecology it offers the hatchet to take a part lopsided and linear and faulty and political problematic you know accounts of

environmental change or environmental crisis, which we will elaborate in our next life. So, on one hand it takes apart it offers the hatchet to take a part this politically problematic accounts or main similar accounts the environmental change or environmental crisis on the other hand it also offers the seed the seed to show you know new alternative social ecologies.

So, in that sense it is very comprehensive in this in that sentence it is inclusive and also extremely radical branch of I know the social science, but maybe I know some as a for Robbins is that is not a discipline, but a community of practice. So, it is being pursued not only by academicians part anybody in everybody under the sun can actually pursue political ecology, yes

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**Beyond the Malthusian prism**

*Essay on the Principle of Population* (1793)

Ecoscarcity or capitalist consumption patterns?

Resource	India	United States
Meat (kg, 2002)	5	125
Paper (kg, 2005)	5	297
Water (m <sup>3</sup> )	633	1,687
Energy (kg oil equivalent, 2005)	514	7,921
Carbon emissions (tonnes, 2005)	1	20

Source: World Resources Institute 2010

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So, we need to understand Malthus, we need to understand this proposition in this particular book, which of course, add it is you know long drawn implications and legacy, on academics and also on policy circles, and we also need to know about the entire theory of you know ecoscarcity. So, we need to know about ecoscarcity, and we need to know about Malthusian understanding of environmental change. So, it I mean the argument is quite straight forward.

So, the argument is that the when the numbers of human population or when human population absolute numbers with increased, that would definitely create whole lot of stress on the environment because if that exceeds if the in if the human population in

exceeds environmental capacity, then that will be problematic for both the environment and human beings, because environment the natural assets will be extracted and it will be over exploited.

So, and most of this natural assets they are you know they are not they cannot be renewed. So, they are non renewable. So, what will happen is that this natural assets would be gone. So, that would be a problematic for the survival and sustenance of human beings as well because that would lead to human starvation and that would also lead to disease based or you know disease related mortality.

So, this is the theory of ecoscarcity all about why ecoscarcity is absolutely explained in terms of population growth absolute numbers. Now, the whole question is that is this a comprehensive perspective, the answer is straight forwardly no because like you know if we get influence by eco scarcity, then what we do is that we miss the other very important vital parameters like technology or affluence that also play very important role,

In environmental change or in environment crisis, and on the other hand what happens is that this theory of eco scarcity that actually tries to blame you know underdeveloped country is also called third world countries like India, because here the growth rate of population and absolute numbers are highest and compared to the you know the so, called developers of the world like the united states. But that these particular theory or this particular explanation is lopsided and faulty then it has come out very well in this particular table design by the world resources institute, and then title of the table is also very exciting it is like who is overpopulate.

So, you can see you know they are try to assess the so it is a kind of a comparative assessment of per capita consumption of resources and also generation of west and you can see how you know the per capita consumption of resources of countries like India, with more population is much less than per capita consumption of resources of countries the united states, where the demographic pressure is much less than you know some of the south Asian or African countries.

So, these table it points out it clearly shows and indicates that you know the arguments, or the propositions, embedded in theories like eco scarcity does not hold you know ground today. So, with this and now come to the 5 theses of political ecology, again



which has been proposed by a Paul Robbins, in his a particular book on particular ecology particular introduction. So, I will try to explain this thesis one by one.

So, the first one is degradation and marginalization so what is explained here is environmental conditions? More importantly degradation and the reasons for changes in environmental condition; So, environmental conditions and reasons for changes in environmental conditions focusing on of course, degradation. So, it says that environmental degradation long blamed on marginal people is shown in it is larger political and economic context. So, we have discussed this the earliest slide as well that you know.

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Thesis	What is explained?	Relevance
<u>Degradation and marginalization</u>	<u>Environmental conditions</u> (especially degradation) and the reasons for their change	Environmental degradation, long blamed on marginal people, is shown in its larger political and economic context.
<u>Conservation and control</u>	<u>Conservation outcomes</u> (especially failures)	Usually viewed as benign, efforts at environmental conservation are shown to have pernicious effects, and sometimes fail as a result.
<u>Environmental conflict and exclusion</u>	Access to the environment and conflicts over exclusion from it (especially natural resources)	Environmental conflicts are shown to be part of larger gendered, classed, and raced struggles and vice versa.

So, the (Refer Time: 16:35) fail on the third world and it is population because as the eco scarcity theory it try to prove that, these people were responsible for you know environmental crisis. But then we could see that this is actually wrong because the marginal people, should not be blame for environmental degradation because this is not a proper way of looking into things rather it is important for us to understand and explore the larger political and economic context.

We need to know about technological choices our society for example, we need to know about you know several other factors like affluence greed etcetera. So, these are the things that need to be taken into consideration otherwise you know, I mean only blaming

the marginal people it would not be right or it would not be an appropriate way of understanding or looking into degradation of or degradation of environmental conditions.

So, this is what this is all about the first thesis of political ecology followed by the second thesis which is conservation and control this is also very important. So, it talks about what is explained in this theses conservation outcomes again failures. So, what are the outcomes most of the times you will see that you know this conservation effects they had actually they had had extremely catastrophic and negative implications for a the ecology as well as social livelihoods.

So, I will explain this by saying that a source first let us look into the relevance of this thesis. So, I mean Paul Robbins says that conservation and control their generally viewed as benign efforts at environmental conservation as shown to have pernicious effects and sometimes fail as a result. So, I mean this way of looking into this as benign and you know an extremely beneficial is actually an a political approach.

So if you really want to pursue it or understand it by using the political lens will be able to understand that conservation you know approaches, or conservation initiatives, they are extremely thickly loaded with political and economic imperatives of the implementing body for example, the stagecraft. Now, I would like to give an example using the Indian context in this regard because if you remember that during the colonial times Dietrich Brandis is he came up with a particular theory, which is called the theory of scientific forestry or scientific management

Through which for the first time Indian forest, where actually some of forests were declared as reserved forest. So, what happened is at the says that why they want to do reserve these Indian forest because in order to protect them. But then so, what happened is that immediately you know the forest villages, there were not allowed to enter into the forest, they were not allowed to access the timber and non timber forest produce. So, the forest resources become extremely you know enclosed.

Now, what have been the outcome, So, did that did that really protect Indian forest for if we see statistics if we see data we will find out that that was a period from when actually deforestation of falling of trees increased at an you know at an intensified pace.

So what was happening was the tree is were used to in a construct railway lines the trees were used for the ship building industry, and all that. So, we need to really understand that you know this conservation and control mechanisms. These are not you know our political initiatives rather than thickly loaded with political and economic imperatives of rule or stagecraft.

So next coming to the third thesis the third thesis on environment conflict and exclusion, So, what is explained access to environment and conflicts over exclusion from it that is from access to environment and the relevance is that it explain that environment conflicts are showned the environmental conflicts are part of larger, gender, classed, and raced struggles and vice versa. So, here what happens is that the ecology is polity size and politics is ecologist.

So you can understand the greater or the deeper relationship between environmental conflicts and their social parameters the social dimension like gender class race etcetera ok. So, coming to the fourth thesis it is all about environmental subjects and identity; so, identities of people and identities of social groups. So, political identities and social struggles as shown to be linked to basic issues of livelihood and environmental activity of course, and this is extremely this becomes relevant you know within the context of South Asia.

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<u>Environmental subjects and identity</u>	Identities of people and social groups (especially new or emerging ones)	Political identities and social struggles are shown to be linked to basic issues of livelihood and environmental activity.
<u>Political objects and actors</u>	Socio-political conditions (especially deeply structured ones)	Political and economic systems are shown to be underpinned and affected by the non-human actors with which they are intertwined.

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For example because in south Asia we will find that you know environmental protection and the sustenance of social livelihood they are complementary, they are intricately inter linked there is a there is a strong relationship there is strong interaction between environmental protection and sustenance of community livelihoods. For example, if we take the what happened during the Chipko movement in India, or even the what happened during the Narmada Bachao Andolan.

So, were you know Medha Patkar several other leaders they were you know they were protesting against the construction of the dam, the protesting against implementation of the Sardar Sarovar project on the Narmada river. Then what happened is that they were actually protesting against the you know the they were protesting against not only the dam, but they were protesting against the faulty policies that would actually affect or that would cause social disruption.

So, even like when the chipko of in the during the chipko movement tribal people they hug the they hug the trees. So, why were the hugging the trees because their intention of the purpose I mean, to save the trees was that that if this trees would be cut then what would happen with that from the next day they would be having you know survival problems, because their livelihood their occupation are directly related to the environment to trees.

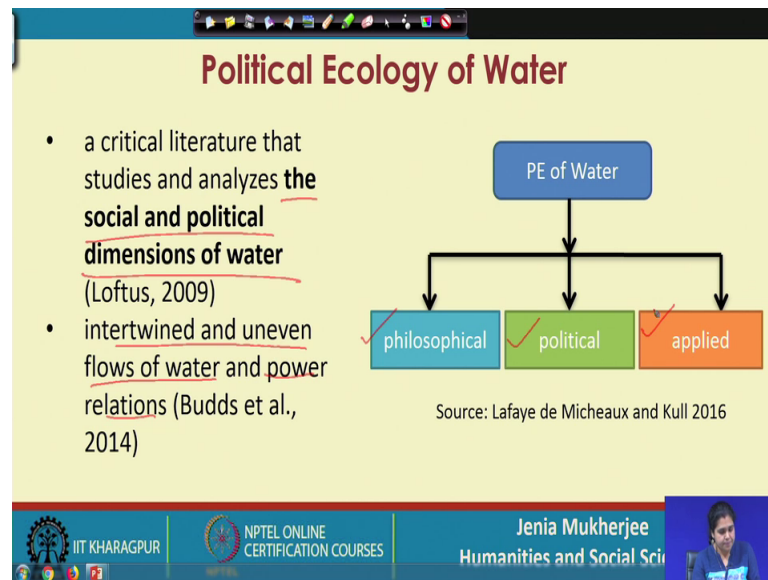
Similarly, you know if a dam is constructed on a river then that can create a floods and a during the pre implementation phase also land would be annex the from the villagers due to the you know construction project and all that. So, these are all directly related. So, in India in when people protest or if you see the nature of this new social movements we will find that people were protesting not only for nature for nature sake, but nature in a for the sake of human beings for the sake of their very own sustain.

So, the final thesis it is all about political objects and actors; So, here you know the material characteristics of the non human you know the non human world like including rivers, water, lawn, grasses, vegetation, etcetera. So, they are intertwined their absolutely intertwined with the with the world of human struggles, and political ecology make us aware about the interconnection between these two.

So. these are the very 5 fundamental theses of a political ecology you know that are very important because when we need to pursue political ecology for example, when I know

social scientist pursue political ecology of water all these 5 theses are some were embedded in their understanding of you know in their understanding all in their exploration of particular case narratives or particular field sites.

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So, now once we know about the framework, once we know about the particular framework of political ecology as a whole. Now, it will be easier for understand or focus into specifically focus into political ecology of water. So, political ecology of water I mean it has come out it is a critical literature focusing on and analyzing, the social and political dimensions of water.

So, we already know by now that you know that water should not be extracted or water cannot be extracted from the local cultural political and social dimensions. So, political ecology is that, critical literature that help us analyze the social and political dimensions of water and he talks about the intertwined and uneven flows of water and power relationships.

So as I mentioned earlier also that political ecology is a particular frame work which explicitly focuses on power asymmetry, which explicitly focuses on power relationships. And yes like recently floor Lafaye de Micheaux and Christians Kull, they did a comprehensive you know they did a comprehensive coverage, on relating to the literature that is available on political ecology of water and they pointed out that there are there could either identified three major trends within political ecology of water.

So the first trend is the philosophical trend that actually raises questions relating to the status and ontology of water, are followed by the you know the political a trend that at denounces capitalism, and that denounces social injustice and that also denounces all you know all kinds of anti democratic measures and initiatives. And finally they talk about the applied trend.

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**Human Dimensions of Water Scarcity**

Water scarcity not only reflects the relative aspects of supply (the conditions and actions that affect quantity and quality) and demand (intended and projected use), but the relative aspects of how water is valued (the cultural meanings as well as economic values), relative levels of access and patterns of use, and the relative degrees of control over water resource management and distribution. Thus, scarcity might reflect the economic ability to pay for water, or, the customs, social conditions, and relationships that privilege access to some while withholding access to others.

Johnston 2003: 74

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So, which you know make researchers or which make people aware about the inherent biases and contradictions prevalent in various water management and for that matter also water governance discourses and practices. Yes So, Johnston again I talked about Barbara rose Johnston and these of it is a comprehensive outline of you know human dimensions of water scarcity, this is a particular court which actually or which actually clearly brings out the human dimensions of water scarcity.

So, the which clearly brings out you know that scarcity political scarcities manufactured, scarcity is a manipulative and. So, it also talks about not only you know the importance of considering a quantity and quality aspects or components of water, but at the same time being aware of the questions relating to entitlement and access. So, this are comprehensive code that says that water scarcity not only reflects the relative aspects of supply.

So, water scarcity not only reflect reflects the relative aspects of supply, the conditions and actions that affect quantity and quality and demand, that is the intended and

projected use, but the relative aspects of how water is valued. So, the culture and meanings associated with water the economics values associated with it class relative levels of axis and patterns of use class relative degrees of control over water resource management and distribution.

So, scarcity might reflect the economic ability to pay for water or the customs, social conditions and relationships the privilege access to some, while withholding access to others this is the most pertinent, you know statements that this last phase the you know the relationships that privilege access to some while withholding access to others. So, who are the gainers? Who are the losers? Who are the I mean. So, who are the beneficiaries? Who are the non beneficiaries? (Refer Slide Time: 29:35)



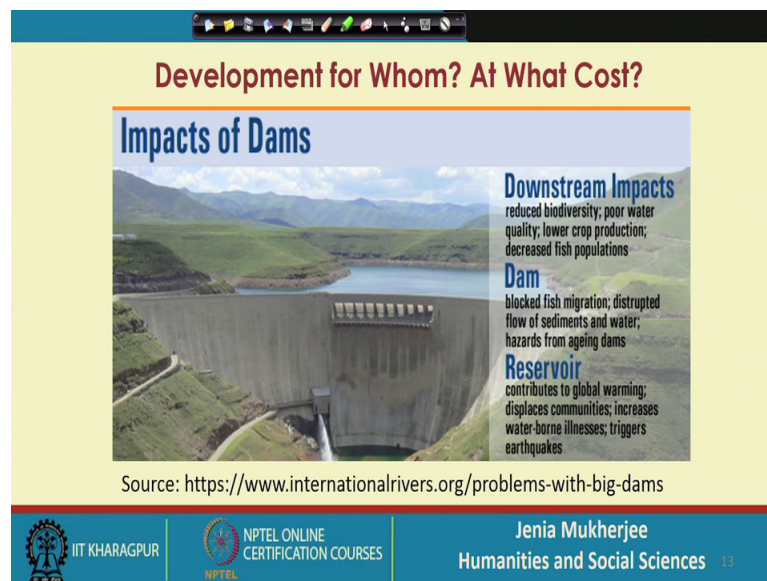
These are the crucial questions that we really need to be aware of. Yes so, now coming to you know exponential growth versus ecological sustainability. So, I mean the challenges that we are facing today or this outcome of the what is going on you know what is outcomes of natural, events like a global warming climate change etcetera or they are also the outcomes of economic development.

So this is also a very important a crucial question because if you understand that in the last few decades you know economic development and urban growth for examples, they have been responsible for the for the you know conversion of almost half of the wetlands all around the globe plus there also been responsible for you know a loss of loss of fish and loss of other ecosystem.



I mean loss of several ecosystem services if we just take the example of one particular country for example, if we take the example of china we will find out that you know in china more than 100 water bodies and wetlands at perished in the last few years. And you know 70 percent of the water bodies and wetlands that has still there. So, that the quality has deteriorated. So, much that these wetlands and the they have absolutely become a dump yards of you know industrial waste and affluence

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**Development for Whom? At What Cost?**

**Impacts of Dams**

**Downstream Impacts**  
 reduced biodiversity; poor water quality; lower crop production; decreased fish populations

**Dam**  
 blocked fish migration; disrupted flow of sediments and water; hazards from ageing dams

**Reservoir**  
 contributes to global warming; displaces communities; increases water-borne illnesses; triggers earthquakes

Source: <https://www.internationalrivers.org/problems-with-big-dams>

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 Humanities and Social Sciences 13

So, again coming to the question of development for whom and what cost. So, and at what cost, So, this can definitely explain and exemplified by the example of dams. So, since the post Second World War period more than 45000 dams have been constructed across the globe, you know as per the report of the world commission and development.

Now, we all know that dams have been constructed to produce hydroelectricity to irrigate paddy fields and to control the flow of water, now but the question is I mean definitely we find whole lot of differences between the official projections or promises and actual relative. So, we will find out that you know dams has been causing massive floods sever ecological and social disruptions in most of the areas and like 5 percent of walls freshwater.

They did just get lost to evaporation from these reserves on the other hand these reseversal also responsible for a meeting almost 28 percent of greenhouse gases which is 4 percent of the total C O 2 emission and also one fifth of human related methane



emission. So, these are some other crucial statistics and figure that we need to keep in mind; So, on the other hand as I mention that it had late to sever ecological catastrophes like floods and also droughts and it had lead to disruptions in social livelihood.

So, indigenous people and also more importantly women they had actually suffer, but the cost of this big infrastructure the cost of is big a project on the other hand they had been absolutely excluded from the benefits of it. So, it is very important it is very crucial this particular question that development for whom and at what cost who are the gainers who are the loser. So, this is the most crucial question within political ecology.


So, coming to the last of the lecture; So, I would also like to focus on that much of this political ecology of water has actually focused on what is known as potable water. So, potable water that is water utilities pipes through which water actually flows; So, much of the political ecology of water literature has focus on this potable water and emphasizing on urban infrastructures.

So, political ecologies they had looped into the uneven distribution mechanism that produce uneven waterscapes. So, at the core of the whole discussion I mean at the core of the discussion had been the choreographies of power that influence how much water flows through urban infrastructure.

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**Urban Political Ecology of Water: Potable Water**

- **potable water supply**; urban infrastructures (Swyngedouw 1997; 2009; Loftus 2009; Acharya, 2015)
- the choreographies of power that influence **how much water flows through urban infrastructure? where it flows?** (Rusca et al. 2017)
- “for the urban elite, water supply is often relatively abundant, and relatively cheap. For the urban poor, the scarcity of potable water is a daily hardship” (Bakker 2003: 333)
- **water quality** (Rusca 2017)



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Humanities and Social Sciences

So, how much water should a quantity and where it flows these are the two crucial questions that political ecologies had been engaged with while studying potable waters in some of the most important cities, that how much water flows to urban infrastructure and where is where the water flows.

So, who determines that where this pipelines would be constructed who determines that which houses are which neighbourhood would be allocated what amount of water.

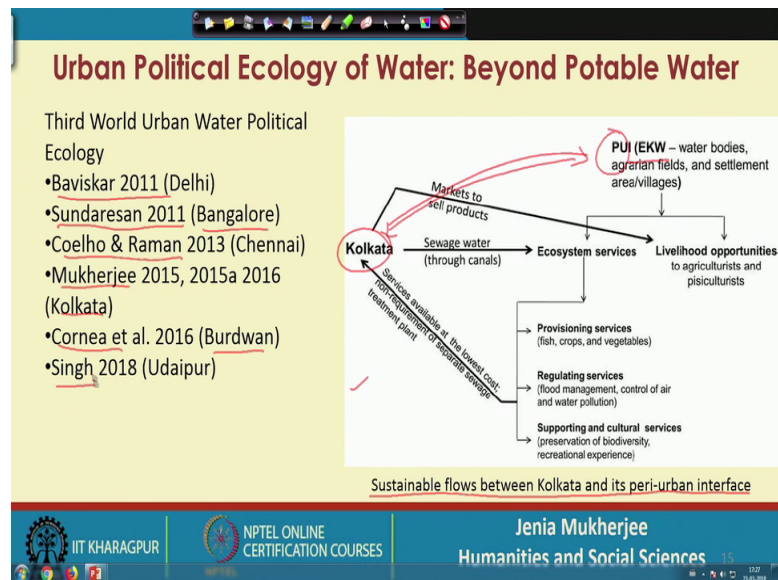
So, these all these questions of distribution the question of allocation the question of construction everything is thickly loaded with you know is thickly loaded with politics is thickly loaded with economic and political decisions made by the state stagecraft and of course, in association with private companies and several other stakeholders who are also involved in this entire power deep.

So this is what a political urban political ecology of water is all about and Bakker's current; Bakker he says that for the urban elite water supplies of an relatively urban that and relatively cheap for the urban poor the scarcity of potable water is a daily hardship. And this is quite prominent we had given that Kolkata example I can give you several other examples of several other cities of the world where this particular think that you know water being cheap for the urban elite and water being you know scarts for the urban poor he is an absolute and an inevitable reality.

So finally, like you know a while political ecologists they used to mainly concentrate on the quantity of water very interesting you know studies today are also coming up. So, far as a water quality is concerned where to recently one particular article has been published in the job forum and it is come out into the 2017 by Rusca and their colleagues, and there Rusca talks about you know he talks about the complex interdependencies among, power, politics, specio you know chemical and microbiological contamination of water.

And he talks about at the same time parallely. He draws our attention to the to the water contamination are the uneven distribution of water contamination within centralized networks and on the other hand you know how that leads to a lot whole lot of inequalities within the urban waterscape.

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So, finally, if you focus into the South Asian almost specifically the Indian contest will find will be amazed to know that this third world urban water political ecology is emerging as a very vibrant field. Many researchers mainly coming from the discipline of history, coming from sociology, coming from anthropology, and even some natural scientist; they are conducting you know water research by using the lengths of urban political ecology.

So, for example, few examples that I have put here, definitely we need to know about amita baviskar work on Delhi I mean Amita Baviskar was focusing on the city of Delhi where she has focus on river Yamuna.

And she has shown that how this river Yamuna has actually transformed from known place you know from a non place no value thing to a real estate price commodity. So, how this shift has happened in the imagination of the municipality and how difference stakeholders like the middle class, the state, the poor. How they had pursued this change

So, she has discuss this in detail in her work on the Yamuna river in Delhi and she has also shown that how this has created you know whole lot of problems relating to a entitlement you know and deprivation among the different social as stakeholders in Delhi.

Similarly, Sundaresan has focused on the lakes of Bangalore, Coelho, and Raman again a fascinating study on the urban land and urban water bodies in Chennai. And they had shown that how you know this water bodies sometimes you know they are perceived as lakes in making sometimes land in making sometimes is resettlement sites sometimes a dump yard.

So, many identities for this urban land and urban water bodies suiting or keeping in tune to the political economy imperatives of stage craft, So, Mukherjee myself I had worked on like the blue infrastructures of Kolkata and using a historical a political ecology of water frameworks I have shown that and this is a diagram in a which shows is sustainable flows between Kolkata and peri urban interface.

So how you know Kolkata and PUI that is peri urban interface in the form of the east Kolkata wetlands around like 12500 hectors of wetlands how Kolkata how the city and the peri urban interface in the form of wetlands they are mutually connected to each other. So and but I have shown that how you know these relationship it evolved during the colonial times. So, that has the long history which I will covered in one of my lectures where I will be mainly discussing in about empirical findings from case studies.

So, but in short like as I will I have shown in this case study that how these mutually interdependent relationship is not transforming unfortunately into a truncated relationship due to due to rapid urbanization and urban sprawl that is taking place in the contemporary times. So, finally, Cornea, Zemer and (Refer Time: 40:55) they had focus on the (Refer Time: 40:58) of Burdwan and Singh Neha Singh she has a focus on changes in the urban waterscapes of weather proof.

So, what I do is that I am going to provide you with the you know the all these papers are all this book chapters and journal articles you and if you can go through this book chapters, and journal articles you will find; you know fascinating accounts of the complexities surrounding you know the water bodies, or waterscapes, in this different Indian cities. So, that would be an exciting venture by itself I guess.

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Slide 16 displays a list of references under the heading "References". The references are:

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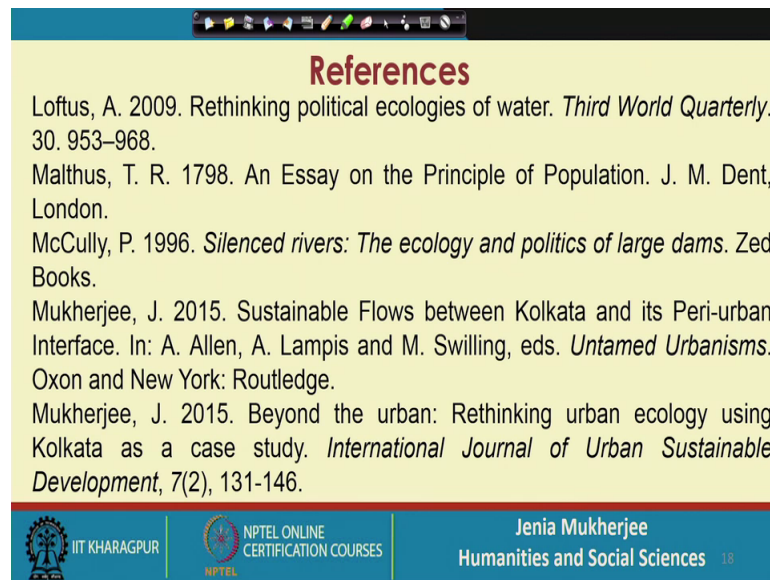


Slide 17 displays a list of references under the heading "References". The references are:

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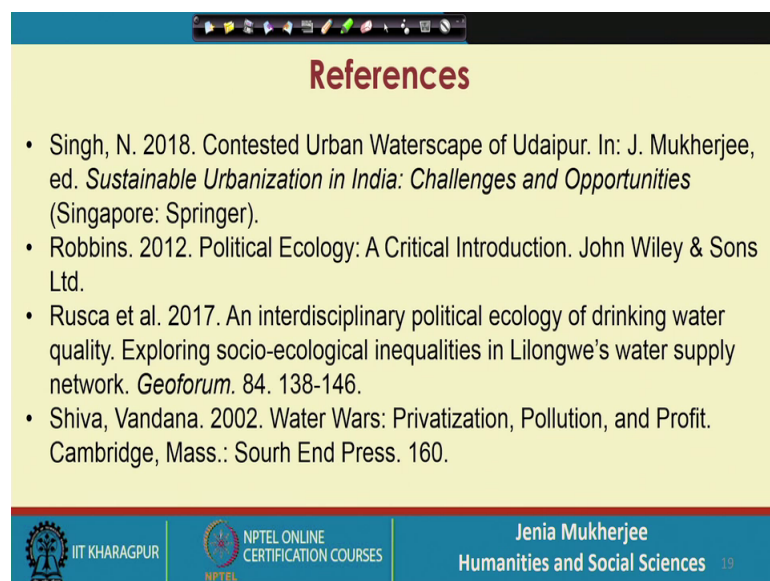
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(Refer Slide Time: 41:54)



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So, with this I would like to finish political ecology of water and these are some other references which would be shared with you; So, that you can have a detailed understanding and explorations about the nitigrities of realities covered here.

Thank you.