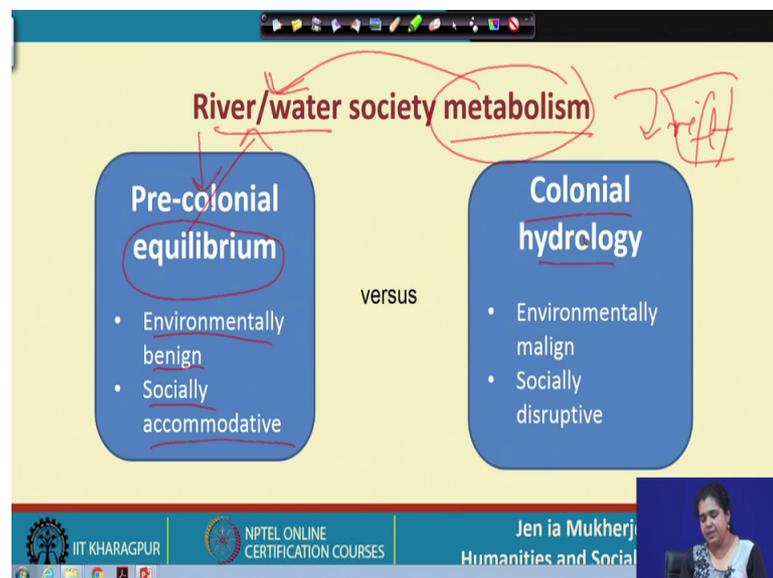


Water, Society and Sustainability
Prof. Jenia Mukherjee
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Lecture - 10
Water Harvesting and Water Use Techniques in Ancient India – III
(Debates and Discussions)

So, this is the final component on water harvesting and water use technologies in ancient pre-colonial India; where I would now enter into a debates and discussion. So, how the different schools of thought or rather how through their long time researches, historian's, environmental historians, water historians, they are trying to, you know, engage into the debate, that whether everything or all the water harvesting mechanisms or schemes that were prevalent in colonial pre-colonial India, whether all of it was really, you know, extremely good and beneficial and had no negative repercussions or implications for ecology and society. So, this is the debate all about like pre-colonial equilibrium versus colonial hydrology.

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So, I will explain it right now. So, I mean there is a particular understanding that during the pre-colonial period there was a metabolic relationship. A metabolism between river and society right; so, I mean and there is an argument that during the colonial period this metabolism, it actually changed into a metabolic rift; again to use a kind of a Marxian

term. So, the metabolic rift is a Marxian concept which has been popularized by John Bellamy Foster in his book on Marx's ecology, and on his, you know, numerous writings on environmental sociology and also environmental social sciences.

So, there is understanding that the pre-colonial period so far as water harvesting mechanisms or techniques are concerned, it was an environmentally benign period, and it was absolutely socially accommodative, ok. So, there was an equilibrium between water and society during the pre-colonial period; this is the argument. And we will see that how, you know, this argument has been validated by numerous examples across different parts of the country. So, this is one argument on the one hand.

And there is, I mean the binary argument is that; so, the pre-colonial period as there was equilibrium between river society relationship, or there was equilibrium in the river society relationship. During the colonial period this equilibrium it is got transformed or the metabolism it was transformed into metabolic rift or disruption. So, while pre-colonial period was environmentally benign colonial period was environmentally malign.

So, while pre-colonial period was socially accommodative, colonial period was socially disruptive. So, this is an argument that now comes up across come across the works of various historians where they try to validate this framework by sightings numerous examples across different parts of the country. So now, let us go to those examples.

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Pre-colonial equilibrium

'flood dependent agrarian regime'

- Diverse production choices ✓
- Flexible taxation arrangements ✓

"He (the Oriya cultivator's) whole system of cultivation has been adapted to an uncertain and precarious rainfall and periodic inundation. He is a gambler, he has one field on the high ground, another in the hollow and another half-way between, so that if he loses one crop by either flood or drought he is pretty sure to save the other."

DROWNED AND DAMMED
Colonial Capitalism and Flood Control in Eastern India
Rohan D'Souza

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So, starting with Rohan D' Souza, the book that I talked about Drowned and Damned published in 2006. An immensely influential book on the Orissa on the Mahanadi delta; so, he talks about the, you know water harvesting and water management practices in Orissa across a long term historical scale from the pre-colonial to the colonial. And also a little bit of the post-colonial times when finally, the Hirakud dam was constructed on the Mahanadi river.

So, Rohan D' Souza shows that and argues that how Orissa or how the Mahanadi delta it I mean was a scape where the farmers absolutely, you know depended on flood for agriculture. So, he says that the pre-colonial period was a flood dependent agrarian regime. So, this is in argument in this particular book on focusing on Orissa. So, he says that as I mentioned in my earlier lecture that flood was not at all looked into as a curse; it was looked as a boon or a blessing. So, it was understood by the farmers that flood was an absolute necessity for agriculture, because once flood water would recede than the soil would be left with very fertile alluvial soil.

So, how they used to tackle flood? So, they were very clear about the seasonal pattern or the seasonal flow of the river. And what, I mean they had developed very interesting and innovative agricultural practices; which was absolutely in tune to the mood of the river. So, they you know, developed diverse production choices. So, you know, if we think about the different varieties of a paddy cultivation in Orissa which was prevalent during the pre-colonial times we, you know, we get to know about at least 3 varieties of rice. So, one is the Bihali, the other one is the (Refer one: 05:48) and the other one is the Daluva. So, they were the different strains of rice.

So, for example, (Refer Time: 05:54) was not I mean during heavy floods or during heavy rains; there was a high chance that (Refer Time: 06:03) harvest would fail. So, that time it would get compensated by either Bihali or Daluva. So, this was the kind of an innovative strategy that they thought upon, that we will keep our production choices diverse so that, you know, if there are seasonal variation in the flow of the river, then our agricultural regime or our, you know agricultural pattern would not get absolutely effected.

So, this was one and related to this was that there was also a flexible taxation arrangement that was that existed in the Orissa delta. Because the rulers and the

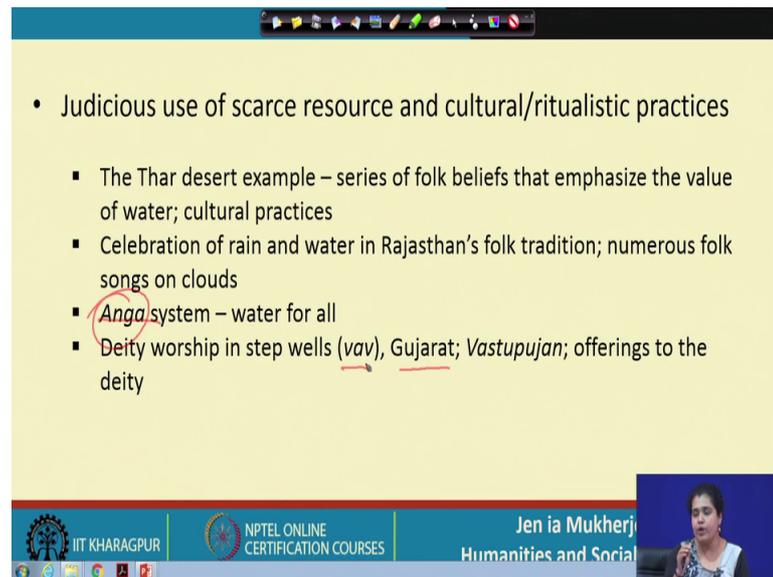
intermediaries, they were also quite aware of the fluctuations in the flow of the river; so, the also the fluctuation in river courses. So, during floods the farmers were not supposed to provide lot of revenue to the state, but then when the flood water would recede, and then the there would be sealed on lands and then there would be good production. And after that they would be charged with revenue.

So, this was a flexible system that was maintained before the implementation of the permanent settlements. Because we all know that how this flexibility absolutely your transformed into rigidity when permanent settlement was implemented in, you know, Bengal, Bihar and Orissa. So, this diverse production choices and flexible taxation (Refer Time: 07:32) arrangements these were the two major pillars, that help the farmers to continue with this, you know, with this topography or with this seasonal pattern or seasonal flow of the river. And hence, Rohan D' Souza says that Orissa during the pre-colonial time it was absolutely a kind of a flood dependent agrarian regime, but not a flood vulnerable landscape which happened much later.

So, even this is a from a colonizers account where he says that the Oriya cultivators whole system of cultivation has been adapted. So, they used to carry on adaptive practices; to an uncertain and precarious rainfall. So, for the British it was very risky. It is Britsher were apprehension and anxious of the system. Because, you know, the pattern was very uncertain. So, there was lot of uncertainty and risks involved in the whole affair, but they say that the cultivator he was he quite well adapted to the system of uncertainty and risk. So, and also periodic inundation, he is a gambler a very interesting term that, you know they use so, he is a gambler.

The farmer is a gambler, because he know how to adjust with risks with uncertainty. So, he is a gambler he has one field on the high ground, another in the hollow, another half way between. So, that if he loses one crop by either flood or drought he is pretty sure to save that. So, see the kind of wisdom that is involved in our pre-colonial system in deltaic regions and scapes.

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- Judicious use of scarce resource and cultural/ritualistic practices
 - The Thar desert example – series of folk beliefs that emphasize the value of water; cultural practices
 - Celebration of rain and water in Rajasthan’s folk tradition; numerous folk songs on clouds
 - Anga system – water for all
 - Deity worship in step wells (vav), Gujarat; Vastupujan; offerings to the deity

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So, we now know about Orissa, now if we focus our a direction towards the west. We find that, you know, west was so, it Orissa was delta. So, the problem of how to tackle flood waters that was the main concern. And in the arid and the semi-arid region the situation was quite the rivers. Because there was in western India there was the question of scarcity of resource. So, how to go about or how to pursue judicious use of scarce resource, and how different interesting cultural ritualistic practices were there were embedded in a for in to pursue to continue or to propagate judicious use of scarce resource.

So, for example, if we, you know, if we if we learn about some of the folk traditional, folk beliefs that are prevalent in this region of the west, then we will see that how this series of folk beliefs. It emphasize still it emphasizes the value and sanctity of water. For example, I will give one or two examples, you know, I mean again we do not have much what to say sophisticated scientific documentation on these, but we have to rely more on ethnography and oral narratives to know about the different cultural practices that are prevalent in western India in the semi-arid and arid regions.

And there are few cultural practices which say for example, you know, a daughter would have been scolded by a mother, if she wears a tumbler of water. But she will not be scolded by a mother if she wastes a tumbler of milk. So, this is there in the folk belief I mean in the folk literature. So, this is one. Secondly, like it is said that if special guests

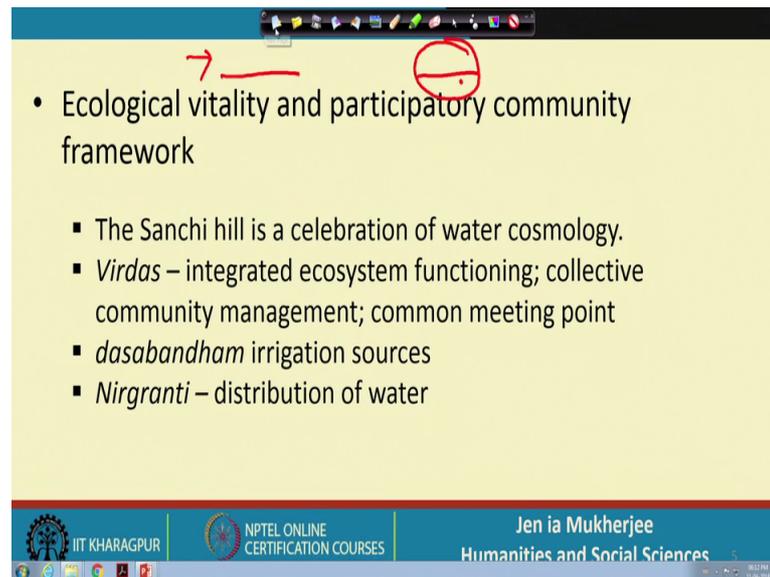
arrives at household, then the special guest will only be offered a glass of water, but only one glass of water followed by glasses of milk.

So, milk was not a problem, but water was a problem. So, they were very much, you know, concerned about they were very much engage into the judicious use of scarce resource which is water in this particular context. So, there are very interesting other, you know, cultural practices that we get to know from this traditional folk beliefs folk songs folk literature stories and all that. And the for example, rain and water are celebrated in Rajasthan's folk tradition like anything. So, no state in Rajasthan have I mean sorry no state in India have so many folk songs on clouds as Rajasthan has.

Apart from that there is this Anga system. And I would like to add here that this Anga system is, you know, it is a kind of a beyond anthropocentric system. Because it is a system which was extremely important which, was extremely important for the egalitarian and equal distribution of water. So, Anga it means a unit. So, how per unit of water was, you know, measure for each and every household. So, the first what I mean the first the households structure was mapped, that how many people how many animal's and, you know, how many other animal beings, and then what amount of water would be allotted to that particular household. Then, you know, in Gujarat we talked about the step wells for the vavs.

And so, when the step well was excavated immediately after that a deity I mean there was deity worship. So, the deity was offered with, you know, with fruits and vegetables and other offerings. Because the cultural practice of deity worship, and the technical history of excavation of well are extremely interconnected. So, Vastupujan is another ritualistic affair that is again connected with the excavation of the step wells; so, and offerings to the deity that I had already mentioned.

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The slide is a presentation slide with a yellow background. At the top, there is a blue header bar with a navigation toolbar. Below the header, the main content area contains a bulleted list. The first bullet point is "Ecological vitality and participatory community framework". Above this text, there are handwritten red annotations: a red arrow pointing to the right, a red horizontal line, and a red circle with a horizontal line through it. Below the main content, there is a blue footer bar with logos for IIT KHARAGPUR, NPTEL ONLINE CERTIFICATION COURSES, and the name "Jen ia Mukherjee Humanities and Social Sciences".

- Ecological vitality and participatory community framework
 - The Sanchi hill is a celebration of water cosmology.
 - *Virdas* – integrated ecosystem functioning; collective community management; common meeting point
 - *dasabandham* irrigation sources
 - *Nirgranti* – distribution of water

So, first we saw that like flood dependent agrarian regime. Secondly, we saw in the in the in the water flush regions like Orissa or the deltaic regions. Then we saw the judicious use of scars water resource in the arid and semi arid region. And now we should look into another framework which is the framework of ecological regeneration of vitality and participatory community framework that are very much associated with the idea or the conceptualization of pre-colonial equilibrium.

So, for example, Sanchi hill is a celebration of water cosmology *Virdas* we talked about *Virdas* if you remember. So, *Virdas* it is again an integrated ecosystem functioning, because like vegetation is also grown there and vegetation is very important for the infiltration of freshwater. So, we see how vegetation forestry water everything, you know, embedded in the in the in the construction excavation and functioning of these water harvesting techniques.

So, and apart from that, you know, all these involve collective community management. This is also very important. So, this was this is this is not top down the management or the ownership is not top down, but it is participatory and it is bottom point sorry bottom up. So, and this *Virdas* it also had a lot of, you know, cultural and social meanings, because these were also sometimes common meeting points where elders used to meet they used to take rest under the shade of trees and all that.

Again there are few sources so, for as south India is concerned it is called the Dasabandham irrigation sources. That Dasabandham irrigation sources which talks about like how the cultivators were encouraged to construct tanks on rain free land. Or how, you know, there would be exemption of land revenue if they were engaged in to the construction and excavation of tax.

So, these are some of the social practices that were performed with these, you know, which was closely connected to this water harvesting mechanism. And we also have Nirgranti that is the village servants. So, the village servants were in charge of distribution of water from tanks. So, it is bottom up it is participatory. So, these are some of the arguments that are made to validate the framework of pre-colonial equilibrium.

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Beyond reductionist dualisms

- canals in the northwest became a source of economic dynamism and constant innovation (Stone 1945)
- hydraulic engineering projects in the deltas of Cauvery and Godavari Rivers were "less environmentally disruptive or destructive than colonial-riparian works of the north and blended more into the environmental and cultural landscape of the respective delta regions" (Schmitthenner 2011: 181)
- commercialization and peasant indebtedness were processes that predated colonial regime in the region, and which were integral to the expansion of well irrigation in the west (Hardiman 1998)

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Now, we will critically interrogate whatever we have learnt and discussed till now. So, new interesting researches are coming up in the water history sector; where historian's they are not only using, you know, field research. But they are also include using extensive ethnography and anthropological approach to understand like what are the existing realities or even what where the existing realities in different parts of India during the ancient time. So, whether the ancient water management or water harvesting system was absolutely holistic, or not this is the crucial question of the grand question that needs critical intervention.

So, like for example, I will give the example of iron stone who wrote on the north India and more important north west, frontier province critiquing and criticizing the discourse put forward by Elizabeth Vitkov. Because Elizabeth Vitkov showed that how in a water management in northwestern India during the pre-colonial times more specifically during the medieval times, where I mean extremely important for the agricultural productivity for increasing the agricultural productivity in that region, but how that was absolutely replaced by the by colonial hydrology. But stone shows that how canals in the northwest became a source of economic dynamism and constant innovation.

So, stones argument is not as linear as Elizabeth Vitkov. So, definitely we can debate on this because Elizabeth Vitkov when he when she wrote in 1972 which will discuss again when we will discuss in detail colonial hydrology. But the when Elizabeth Vitkov published in 1972, she to a great extent look into looked into all the very important economic statistics for the different for, I think 40 districts within that range of north west frontier province. So, we can definitely challenge stones argument as well. But then stone also uses empirical you know, data and find it is to show that northwest how you know, the canal system introduced by the British became a source of dynamism and innovation for the farmers.

So, so far as south is concerned then there is recent research by Peter Schmitthenner and he writes that hydraulic engineering projects in the deltas of Kaveri and Godavari rivers; where less environmentally disruptive or destructive. So, this is an argument that again challenges the arguments put forward by many other historian's focusing on south India. So, he says that this system was less environmentally disruptive, than colonial riparian works of north. So, he compares uses a comparative framework comparing north India with south India and says that the colonial, you know, hydrology framework for south India was little was less disruptive and destructive than north India.

And he says that here in south India, it blended more into the environmental and cultural landscape of the respective delta regions. So, this is the alternative arguments that Schmitthenner talks about. Then coming to Hardiman; so, Hardiman says that Hardiman talks about the west. So, we I mean we have covered northwest, we talked about south and now we are talking about west. So, Hardiman he says that commercialization and peasant indebtedness were processes that predated colonial regime. So, there is nothing to, you know, romanticize or utopianize the pre-colonial period so, because peasant

indebtedness. So, I remember like Sherris, you know, (Refer Time: 20:31) statement that like the peasants the farmers. They are they born depth, they live in depth and they die in depth. So, this peasant indebtedness or the farmer indebtedness is a universal phenomenon across historical scales.

So, he says that it predates the colonial regimes. And these characteristics that, is commercialization and peasant indebtedness were integral to the expansion of well irrigation in the west. So, it had nothing to do really with the colonial period though, you know, he does not denied that the colonial period was also disaster for indebtedness and commercialization. But he says what he says is that it already began, the processes began before the onset of the colonial revenue.

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Contd.

- co-existence of 'modern' with pre-colonial techniques in western India (Rosin 1993)
- village communities were unstable entities driven and shaped by hierarchies (Mosse 1997, 1999, 2003)
- folksongs and stories inscribed in popular memory bear testimony to hydrological irregularity, technological vulnerability, and social anxiety (Shah)

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So, again focusing on western India like Hardiman (Refer Time: 21:29) Rosin (Refer Time: 21:31) Rosin talks about the co-existence of modern with pre-colonial techniques in west India. So, he says that it is not the theory of replacement, but it is the idea of co-existence. So, both the system the colonial and the pre-colonial co-existed with each other. So, the pre-colonial was not replaced by the colonial hydraulic techniques, but rather in western India in this both this systems it had a parallel co-existence.

Mosse had done lot of work on south India, specially focusing on Tamil Nadu, Sivaganga and Ramanagara districts, which are very famous for extensive tank irrigation system. And most likes that village communities were unstable entities talking about the pre-

colonial period, he says that village communities were unstable entities. Driven and shaped by hierarchies so, that is the key work hierarchies. So, casteism was again embedded in the system. So, if we take a look into the you know, entire process of an excavation of tanks we will find a lot of caste hierarchy in it, labour exploitation, caste hierarchy.

And finally, as I was talking about Esha Shah; so, Esha Shah she had written two very interesting articles and the names of the articles are also very fascinating. So, the names themselves indicate that she is really coming up with some alternative narratives and histories. So, one article is I mean the title of one particular paper is seeing like a subaltern so, you understand that. So, herself how she is applying ethnography or the ethnographic approach, and how she is seeing the whole thing the larger picture as a subaltern and trying to understand the entire affair from the perception and perspective of a subaltern.

So, one is this seeing like a subaltern and other paper is called telling, otherwise again very interesting name telling otherwise. So, what we know now might not be the entire ground reality. So, it is important to tell otherwise to know the, you know, other stories that are there, but which were often which had often remained neglected and ignored till now. Because our, I mean the methodologies that we had applied might be not that sophisticated, right. So, she tries to capture the micro realities again in south India are focusing on Karnataka, mainly and she I mean she had consulted the folksongs and stories.

So, as I mentioned it is an ethnographic methodology that she had used. So, she had consulted folksongs and stories inscribed in popular memory so, from oral narrative. So, which bear testimony this is a very important bear testimony is what to hydrological irregularity technological vulnerability and social anxiety. So, she slashes, you know, this frame work of pre-colonial equilibrium versus colonial hydrology, by saying that no particular regime, you know, can be extremely beneficial for subalterns like a people, you know, situated at the lower arms of the society. Be it gender, be it caste, be it class, be it race, be it ethnicity whatever.

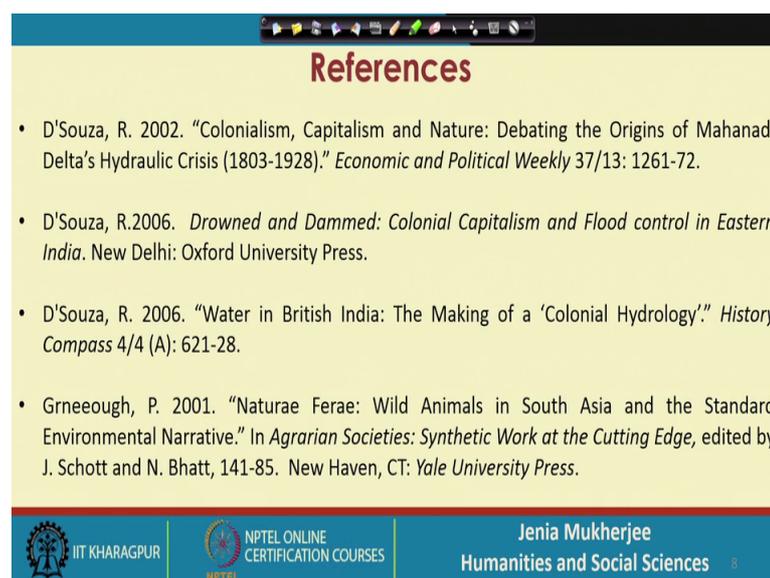
So, these are the alternative ideas that are coming up today. And enriching the field of environmental history and more important water history and provoking us not only to

think in linear terms to know the, you know, water harvest to know the wisdom that was there in ancient India. So far as water harvesting or water use technologies were concerned, but at the same time also not get carried away or not to, you know, romanticize or utopianize those things by saying that everything was extremely, you know, beautiful and everything was what to say rosy. So, this is the framework which I have tried to conceptualize as beyond reductionist dualism.

So, again finally, I would conclude by saying that I mean it is not compulsory for us to either take Rohan D' Souza's view point or, you know, get convinced by Esha Shahs view point. But we must say that, you know, there are micro realities so far as regional specificities are concerned. So, it is important for us to take into consideration the micro picture to know about the macro framework, but also in a in great details, in minute details also to capture the micro ground realities that are that existed or that are still prevalent across, you know, particular regional particular regional sites of India.

So, what is important for us is to deploy the methodology of the, which what is known as, you know, epistemology of particulars in social sciences. So, it is important from the very beginning to, you know, be little conscious and aware of the scientific validation of the, you know, empirical findings or empirical understanding that we try to gather.

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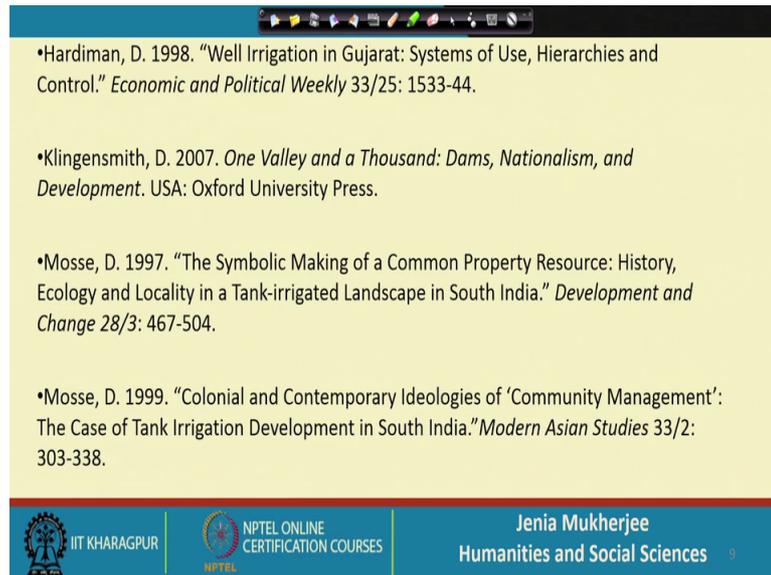
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So, these are some of the important references or works that I could cover.

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And in the next lecture we will be discussing the, you know colonial period and overtly focusing on the framework of colonial hydrology.

Thank you.