

Sociology and Resource Management
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Module - 04
Participatory Approaches to Resource Management in India
Lecture - 20
Problems of Access and Distribution in Resource Management of Water

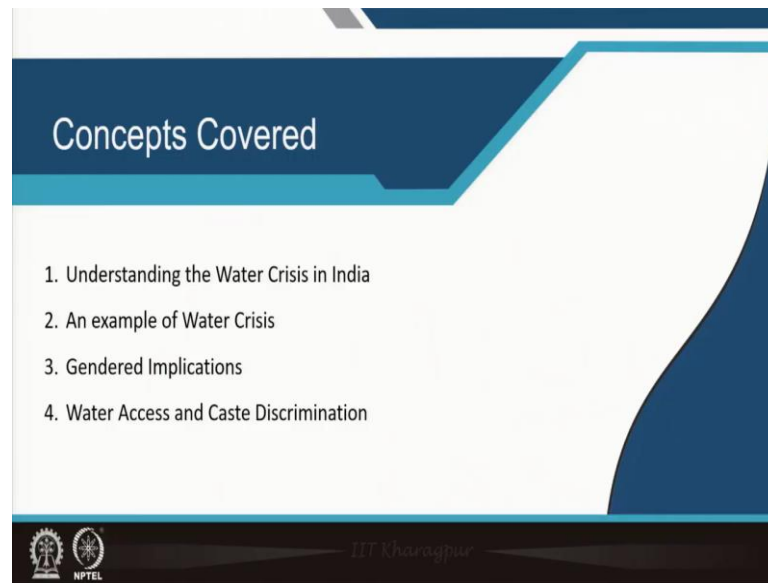
Hello everyone, so today we will be concluding this particular course on the Sociology of Resource Management and as you can see that this is the last lecture of module 4 and I just thought that we had been all this while, we had been talking about Participatory Approaches to Resource Management and the fact that there are particular political problems, socio-political problems associated with the proper implementation of many of these participatory approaches to resource management.

But for in this last lecture, I thought about making the discourse a little different in the aspect that considering the aspect that apart from the issues of political intervention, what are the other social or sociological issues that we can talk about or who would be the other communities, who specifically are the communities, who might get excluded and who do not actually who do not get the chance to holistically, sort of. get to holistically get involved in the management of a resources because of multiple structural constraints and socio-political factors.

And we will be talking about some cases particularly about water Access and distribution of resource management of water and several other environmental challenges as well. So, this lecture would be about an equity approach - the problems of equity and equal distribution within the different communities.

So, we would be talking about gender, we would be talking about class and caste and how these sociological categories or how the communities belonging to these, sort of - these categories, how they are also constantly seen to be excluded from the resource management or access to different types of resources like water. I would be talking about water drawing on specific examples and cases. So, let us begin.

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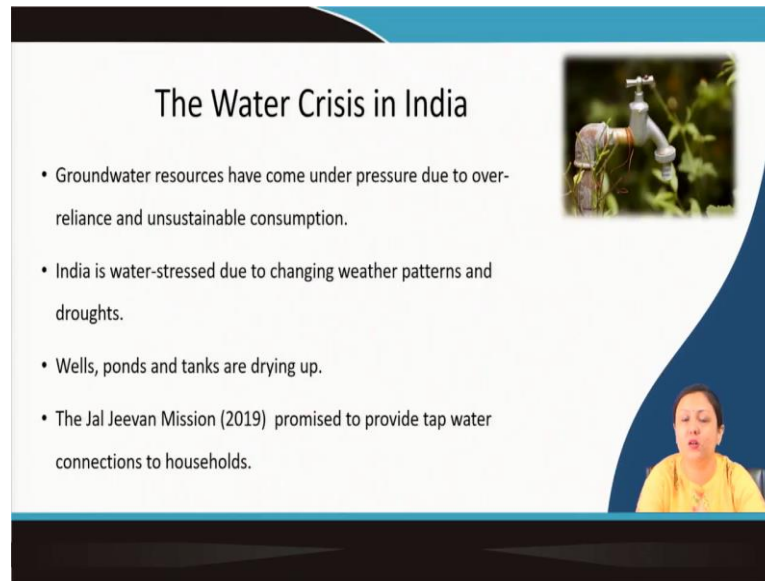


So, this is the outline for today's class first we will talk a little about the specific water crisis in India as many of you would be knowing, I think this is a very practical problem that most of the states in India, they are particularly the many of the northern and the southern states they are actually becoming extremely dry due to intense drought and repeated drought in several parts and we will be talking about the causes as well as the effects. And we would also be talking about specific cases here to bring about a little more clarity.

We will be discussing for instance about the water crisis of Chennai in 2019, which I feel again many of you might be knowing about that Chennai a couple of years back faced an extremely a very, I would say the worst water crisis. Where most of the lakes and reservoirs in and around the city is actually dried up and the city was actually completely it was thirsty and particularly the marginal community suffered the most because of this this prolonged drought conditions.

And moving on we will also try to understand about the social aspects of water access and distribution, and also as I was telling you certain structural discrimination issues we would be talking about particularly gender and class, gender and caste issues - how they can also be they also need to be taken into consideration for to understand, where are the gaps in sustainable water management? So, let us begin.

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The Water Crisis in India

- Groundwater resources have come under pressure due to over-reliance and unsustainable consumption.
- India is water-stressed due to changing weather patterns and droughts.
- Wells, ponds and tanks are drying up.
- The Jal Jeevan Mission (2019) promised to provide tap water connections to households.

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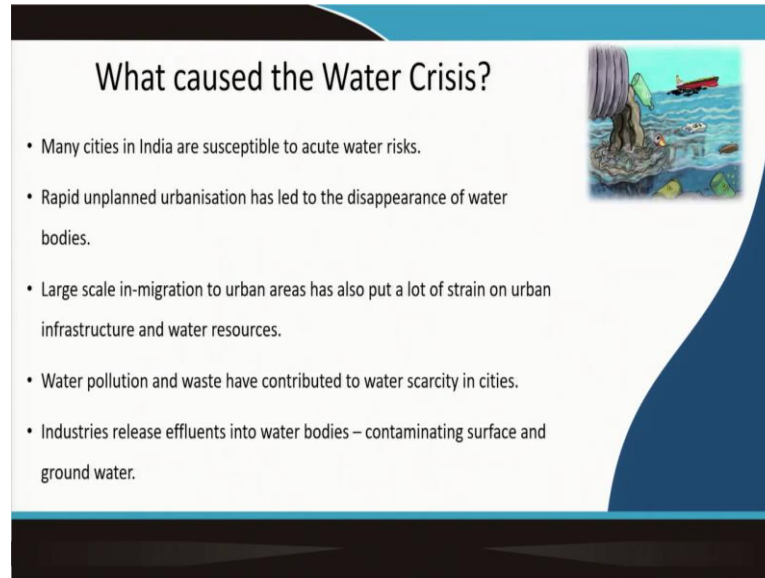
So, it is very common at this point that we are currently facing a water a very acute water crisis in several parts of India and in the contemporary times as we can see in cities like Bangalore and Chennai that the groundwater resources the groundwater levels have come under increasing pressure, due to over reliance as well as unsustainable consumption and so much.

So that we can say that the wells the ponds and the tanks in many cities which earlier had a very an extremely vibrant and a very integral water management system cities which had multiple lakes and reservoirs, we can actually see that most of them are actually drying up. And it is more of a problem and it is more of a hazard I would say because India constitutes 16 percentage of the world's population but you would be surprised to know that the country has only 4 percent of the world's freshwater resources and that is why with the changing weather patterns and these recurring droughts India is largely becoming 'water stressed.' And currently drawing on several statistics we can see that as many as 256 have reported critical or over exploited groundwater levels and this is actually the latest data from the Central Ground Water Board in 2017.

And rapid urbanization and lack of basic infrastructure have actually added to this problem whereby the cities are becoming increasingly water stressed. And thus, India has been consistently working towards the improvement of the access of water. Another very important guideline - the Jal Jeevan Mission guideline that was released in 2019

actually provide for the tap water connections. So, they suggest the growing need of tap water connections to multiple households in these hazard and drought prone regions.

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What caused the Water Crisis?

- Many cities in India are susceptible to acute water risks.
- Rapid unplanned urbanisation has led to the disappearance of water bodies.
- Large scale in-migration to urban areas has also put a lot of strain on urban infrastructure and water resources.
- Water pollution and waste have contributed to water scarcity in cities.
- Industries release effluents into water bodies – contaminating surface and ground water.

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Now, let us have a look at the many causes of water crisis in India and this is particularly important to know, I think, because water scarcity, water scarcity in most of the Indian cities is actually caused by a variety of factors. But the most important factor I would say and all of you already know about this is that of the growing climate change.

So, climate change is the most important element that actually exacerbates and accelerates this crisis and also along with that we can see that in most of the urban cover in our country, there is a very rapid and as well as a very unplanned growth of urbanization patterns which has actually resulted in the disappearance of many water bodies across these cities and many of these cities earlier were very vital supplies of drinking water.

These cities as I was telling you they had cities like Chennai and Bangalore as well as several other cities in the north, they had a very integral and a networked system of water bodies with the tanks and the reservoirs being connected to each other and these were very vital supplies of water for everyday needs.

And this particular issue that we are talking about one is climate change and then unplanned urbanization in many of the cities are actually the key causes of water crisis in

many of the Indian cities. So, we can look at the example of about 6000 lakes and reservoirs which once existed in the city of Chennai that we were talking about and two of its neighboring districts the Kanchipuram and the Tiruvallur that had undergone major conversion.

And the conversion of many of these water bodies into residential flats and housing colonies had resulted in the loss of about 2000 or even more than two thousand water bodies across these areas. Also, we, another factor that needs to be mentioned here is that of migration, because we know that large scale in-migration in many of these major cities the mega cities, the urban areas is also a major driver of rapid urbanization.

And very recently according to the national commission on population in India's projections roughly 38.6 percent of the Indians would live in cities in the next 15 years that is by 2036 and this would put further strain on urban infrastructures particularly the water resources, because a water is something that is fundamental and integral to our lives to our existence.

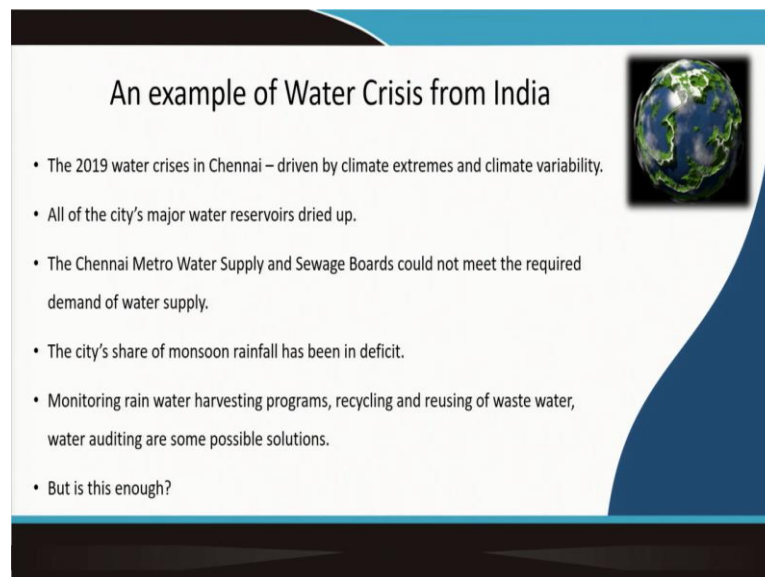
And according to a recent estimate by the World-Wide Fund for Nature (WWF), a very a leading environmental organization, 30 Indian towns would face a severe water crisis by 2050 due to rapid population growth as noted by a particular paper by Bhatia. In addition to this, water pollution and waste are the two more factors that would actually contribute to water scarcity in many of the cities, because we can see that again, many of these water bodies and lakes in the cities they have been severely polluted and they have actually become, if we see that they have become garbage dumps and a lot of effluents and sewage actually goes into many of these lakes and reservoirs making the water not worthy of use - for any kind of human needs. And also, the industries and the municipalities, as we can see that they in most of the times we have seen that they release untreated effluents into the rivers and other water bodies, which contaminates both the surface and the ground water.

And as per the National Institute of Urban Affairs' Climate Smart Cities Assessment Framework 2.0 (CSCAF2.0), in the Cities Readiness Report of 2021, out of the 126 cities that participated in the assessment only 40 cities were found to recycle and reuse around 20 percent of their waste water and not the other rest of it not the other - around 80 cities.

And as per this report only 24 cities out of the 126 cities assessed conducts water audits to assess water losses during distribution; while all cities in the hills and the coastal regions are yet to initiate any measure in this regard. Furthermore, due to indiscriminate ground water extraction water tables in most Indian cities are fast declining. According to research by the Center for Science and Environment, ground water supplies 48 percent of India's urban water supply and groundwater levels have declined significantly in 7 of the country's 10 most populated cities during the last 2 decades. Also, I will quote from another research by NITI Aayog in 2018, which says that approximately 70 percent of India's water is contaminated affecting 3 out of every 4 individuals. During the year 2020 according to Deka in a paper in 2021, supply water samples from 21 cities around the country failed to meet the required standards. Large volume of water have also been lost due to aging corroded and leaky pipeline infrastructure as is noted by Temple.


This can be better explained by what happened in June, 2019. One of India's most populous cities Chennai faced an acute water shortage when the city's 4 major reservoirs dried up after a delay in the onset of monsoons - something we will talk about in greater detail in the next slide.

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An example of Water Crisis from India

- The 2019 water crises in Chennai – driven by climate extremes and climate variability.
- All of the city's major water reservoirs dried up.
- The Chennai Metro Water Supply and Sewage Boards could not meet the required demand of water supply.
- The city's share of monsoon rainfall has been in deficit.
- Monitoring rain water harvesting programs, recycling and reusing of waste water, water auditing are some possible solutions.
- But is this enough?



Now, as we can see here Chennai India's mega city with a population of 8.6 million people experienced one of the greatest water crises in its history in 2019. All the cities- so what happened? All the city's major water supply reservoirs including the Poondi, the

Cholavaram, the Redhills and the Chembarambakkam had dried up. According to Sujith, Sourabh, Guntoju (2019) in the peak of the crisis the Chennai Metro Water Supply and Sewage Board could supply only about 525 million litres a day as against a demand of 830 million litres.

The most convenient explanation was to blame the usual suspect that is climate change for the crisis; however, a careful analysis by this paper revealed that there were a set of diverse factors that resulted in this crisis. So, according to Hegde rapid urbanization in the peri urban areas of the city fueled by population growth and unlawful encroachment consumed vital water bodies, which were the key sources of groundwater recharge were very important factors explaining the reasons that led to this crisis.

The city's share of monsoon rainfall had been in deficit since the 2015-2016 monsoon season, the deficit being as high as 40 percent of the average monsoon rainfall in 2019, resulting in a decrease in groundwater recharging capacity and reservoirs failing to fill up. There has been over extraction of groundwater at times by more than 1.85 times the permitted rate.

Apart from this, there has also been a steady decline in potable ground water due to salt water intrusion. Along with this the city did not fully implement its rainwater harvesting program for tapping surface runoff and groundwater recharge as Hegde actually point out. So, in its 5th assessment report the IPCC, the Intergovernmental Panel on Climate Change had warned, that the changing climate system is expected to reduce raw water quality and pose risks to drinking water quality.

The report also stated that increased global warming will exacerbate its effects on sections of population, currently suffering from drought and flooding. In 2019, the London based risk analytics firm Verisk Maplecroft categorized India as high risk in its 'climate change vulnerability index' report, implying that climate change consequences such as an 'extended dry season' would exacerbate problems in many Indian cities.

However, on the other hand, according to most other climate change projections including Indian Institute of Tropical Meteorology, the hydrological cycle is expected to become more intense while annual average precipitation increase in India though regional and seasonal patterns will vary sharply, according to the Ministry of Earth

Science. The rising temperature could intensify melting of Himalayan glaciers in the coming decades.

A rising global average temperature coupled with intensive monsoon rainfall will see increasing cases of flash flooding across 78 urban areas in India, as per a paper published in the Geophysical Research letters in 2018. Now it is one thing is that we discuss about the pattern and nature of this kind of growing water crisis in our country, but another thing is that what can we do? What can be the solutions in the face of such water crisis scenarios such a global water crisis?

Cities including, what we can do is that - so these are again solutions and these are again sort of different kinds of layouts that are provided by different studies. So, for instance one study says that cities including Chennai can try to adopt a specific approach as per their existing water challenges, future demand and their geo climatic conditions.

So, this would again require the cities considering the crisis scenario the water crisis scenario, cities like Chennai should actually make a proper assessment of the water needs, the water demands, the existing water challenges and until and unless the existing challenges can be tapped and until and unless these lessons can be learned from these challenges it would be very difficult to arrive onto any kind of pragmatic solution.

And further several other studies are saying that for cities like Chennai, the city government what it can do is that it could strictly monitor implementation of rainwater harvesting program which it initiated following the draught of 2001, 2003 for conserving surface runoff and significantly replenishing groundwater. It could invoke the provisions of Wetlands Conservation and Management Rules 2017 to prohibit conversion of water bodies such as lakes and ponds into development spheres.

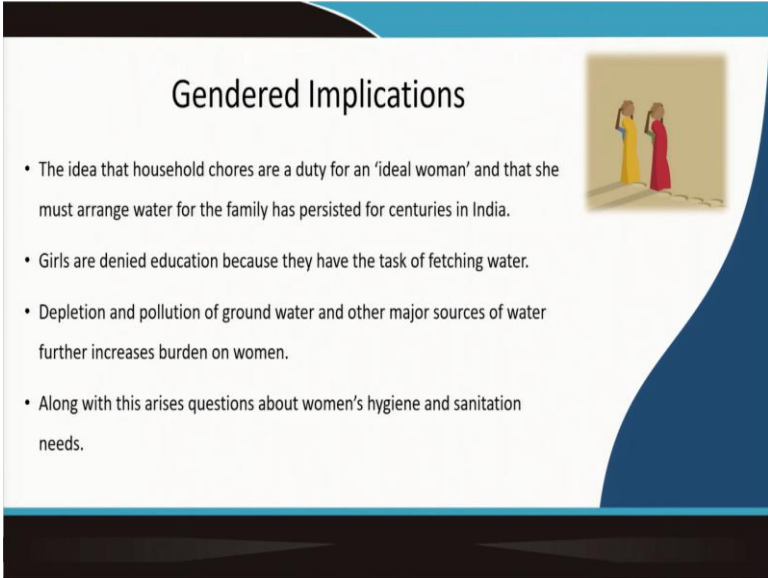
It needs to continuously regulate and monitor groundwater extraction especially along it is coastal areas for preventing sea salt water intrusion. Cities across the country have to formulate plans and strictly implement them to promote recycling and reuse of wastewater for different purposes including industrial use, landscaping and gardening etcetera. Cities with aging water supply infrastructure should take measures to enhance efficiency of their distribution network.

In many cities, water losses during distribution are commonplace and in few cases this loss could be as high as 40 percent of supplied water as observed in Delhi. Besides this the city authorities can take steps to prevent unlawful pilferage of water during distribution, another way cities can access water losses by water auditing cities can conduct water audit to assess water loss and continuously monitor the leakage and loss of water in the existing water supply system and focus on reducing the percentage of loss.

And along with this, another very important aspect is that generating public awareness coupled with tax incentives and technology interface to promote water use efficiently and in an egalitarian way and conservation of water will also be very crucial for the years to come. Cities can introduce schemes like water credit to provide tax incentives, for incentives for water use efficiency and recycling.

We can also leverage technology here technology like water replication with interactive features like tips on water saving, report leakage or sending updates on water qualities etcetera.

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Gendered Implications

- The idea that household chores are a duty for an 'ideal woman' and that she must arrange water for the family has persisted for centuries in India.
- Girls are denied education because they have the task of fetching water.
- Depletion and pollution of ground water and other major sources of water further increases burden on women.
- Along with this arises questions about women's hygiene and sanitation needs.

The slide features a title 'Gendered Implications' at the top center. To the right of the text is an illustration of two women, one in a yellow sari and one in a red sari, carrying water pots on their heads. The slide has a white background with a blue and black decorative border.

Now, I think that with these problems of resource crisis - the availability of resources like water, there also comes several other issues where several other social issues which can be placed in the context of access because often we feel that there is a resource is not available to us because there is a shortage.

But we have to understand that it is not the case all the time resource is also not available to several communities several people, because there are structured discriminations, structured inequities in the society which prohibit a lot of people which actually construct a lot of people from different categories different caste groups from accessing these resources like water in an egalitarian way.

And there are also several - I would say 'structural social dynamics' around the access and utilization of resources, critical resources like water which sort of leads to very devastating consequences for the society itself. And it sets an extremely wrong and troubling examples for the future generation for the coming generation as they can see in front of their eyes. So, something that we would be discussing here in terms of access to resources like water is that of the gender implications.

And it would be worth here, to actually, to look into the to look into the water crisis through a gendered lens. So, here again I quote from a particular article that I would be sharing with you. So, fetching water, for example, in India has been for centuries been perceived as the job of women, especially in the rural areas; we have seen this that women have to spend a lot of their productive time fetching water travelling long distances carrying very heavy vessels in order to fetch water.

And we have actually spoken about how groundwater resources are drying up and this has actually, as we can see, that this has actually escalated the water crisis and placed an even greater burden of accessing water particularly for the women because as water becomes more scarce it becomes more difficult for these women from many of the rural areas to access water, because they have to travel even longer distances in order to fetch this scarce resource.

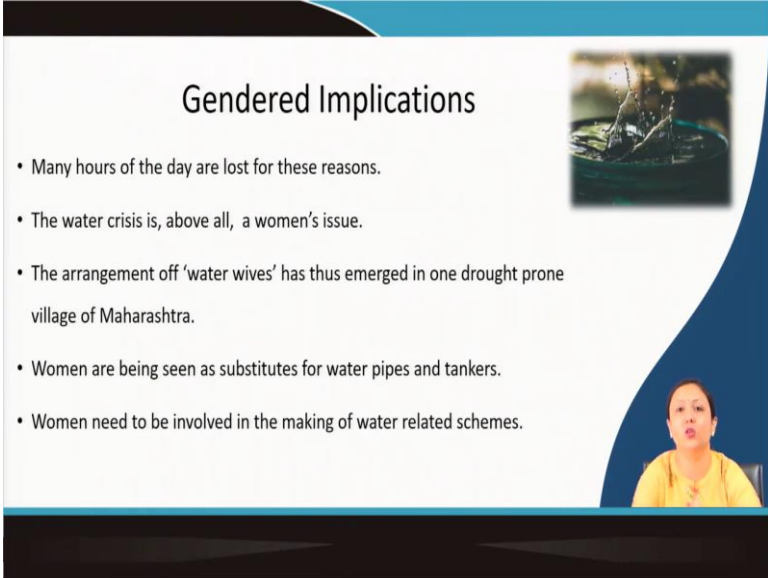
And several girls are denied education – it is very troubling to see this that several girls are denied education purely because they are trusted with the task of fetching water. According to the Central Ground Water Board 2017 as many as 2056 of the 700 districts have reported critical or over exploited groundwater levels, this means that fetching water in these districts have become much harder as the water table has fallen.

So, again a particular article quotes that a rural woman in Rajasthan walks over 2.5 to 3 kilometers to reach the nearest water source according to a report by the National Commission for Women. And this is probably an underestimation, but the bottom line is

that our women, our girls spend a significant proportion of their time fetching water. The idea that household chores are a duty for an ideal woman and that she must arrange water for the family has persisted for centuries due to the patriarchal system in India.

The ultimate depletion and pollution of groundwater as well as major sources of water has further burdened these women, often fulfilling these roles would mean that they cannot they do not get sufficient time to pursue their aspirations, to pursue education or get involved into any kind of productive occupation.

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The slide features a title 'Gendered Implications' at the top center. To the right of the title is a small image of water splashing into a blue bowl. Below the title is a list of five bullet points. In the bottom right corner, there is a video inset showing a woman with dark hair, wearing a yellow top, speaking. The slide has a blue and white color scheme with a dark blue curved border on the right side.

Gendered Implications

- Many hours of the day are lost for these reasons.
- The water crisis is, above all, a women's issue.
- The arrangement off 'water wives' has thus emerged in one drought prone village of Maharashtra.
- Women are being seen as substitutes for water pipes and tankers.
- Women need to be involved in the making of water related schemes.

Also according to a nonprofit named 'Water', women around the world spent a collective 200 million hours collecting water. In addition to the time spent collecting water millions may also spend significant amount of time finding a place to go and relieve themselves. So, as we know that sanitation facilities are also extremely scarce in countries like India. Thus, their marginalization is compounded by the indignity and insecurity of not having a private place to fulfill their sanitation needs.

Addressing women's water, sanitation and hygiene requirements is a critical driver in attaining gender equity and unlocking the potential of half of the world's population. Looking at this, we can definitely say that the water crisis is a women's issue and we as scholars, we as sociologists need to talk about it we need to relate gender issues and caste issues to the access and distribution of resources; when we talk about natural resources we need to more critically relate social and sociological issues like gender and caste to it.

Since men in rural India have completely made women responsible for water management, this has also and you would be very shocked to know this - that this has also led to polygamy in one particular drought prone village of Maharashtra.

This involves and just think about it, that in this particular village men have more than one wife only to collect water and this arrangement is known as 'water wives' where men marry women so, that they can go and fetch water from distant sources. In Maharashtra, which is India's third largest state, the government estimated last year that more than 19000 villages have no access to water and India is again facing the threat of drought this year with monsoon rains expected to be weaker than average. Temperatures have been 5 degrees above normal even in the first week of April.

In western Maharashtra's Denganmal where men work as farm laborers barely earning minimum wages marrying for water have become the norm for several years. The 'water wife' is often either a widow or an unmarried woman whose dowry cannot be affected cannot be afforded by the family.

And just think about this form of a regressive thinking where women are being seen as substitutes for water pipes or tankers. And extending this issue to the urban setup where many people rely on water stand posts or tankers for their daily requirement of water, women again become an easy bridge between the house and the water station.

And also, there are several other cases. So, the transwomen who are referred to as the Hijras and the Kinnars usually if in places that are far from piped water supply. Standing in a queue to collect water becomes more difficult for them because they are perceived very differently, because of their perceived gender identity and the stigma around the same. Hence, many marginalized women can get entrapped into much deeper conflicts further causing social exclusion.

And this whole system of women being forced to be water carriers leads them to having very less time for themselves. And, we strongly need to mention here following these studies that gender roles associated with water need to be ended, we see how important it is to involve women especially those living in the rural areas in the co-management of water. Women have to be involved in the making of the central and the state policies around resource management.

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Caste discrimination

- In India, many Dalits do not have access to safe drinking water.
- Dalit women have to stand in separate queues for fetching water.
- The concept of purity and pollution is at play here.
- Class, caste and gender impact access to water and sanitation.
- We are faced with a power based hierarchical social setup coupled with untouchability and discrimination.
- Dalits have been prohibited from using public well in Kodikulam.
- Water scarcity has become a way of life in Uttar Pradesh's Bundelkhand.



Another lens that we need to explore if we are to fully grasp the problem of water access is that of caste. In India, many Dalits do not have access to safe drinking water and almost 50 percent of Dalit villages are denied access to water source. There are also problems of sanitation as compared to non-Dalits. In fact, a vast majority of the Dalits depend on the goodwill of the upper caste community members for access to water from public wells.

Dalit women stand in several, in separate queues near the bore well to fetch water till the non Dalits finish fetching water. Dalits are disentitled and not allowed to use taps and wells located in non-Dalit area. Dalit villages are not provided water for several days in case the Dalit resent to existing practices of discrimination almost as a way of keeping them at their place.

The caste system which has existed for more than 3000 years in India, is a very traditional system of social segregation and it also here, we need to mention about this that there has been a very prolonged existence of power hierarchy which operates at different levels and also this access to resource is one of the major areas where we find a very blatant use of the power hierarchy.

And water being a limited and an imperative resource has a very close relationship with the categories of caste and gender, especially, when it comes to the distribution of this particular resource. So, at the grassroots level this striving for power is much more than a

process of increasing control over the water resource and control over the behavior of the actors involved.

So, a study for instance carried out by Action Aid across 11 states indicate that all of the villagers, in all of the villages surveyed denial of water services was reported in 48.4 percent of the villages. We also find several cases of exclusion for example in Kerala for example, in Kodikulam a village located under the foothills of Yanamalai, the elephant hill, is considered to be a gifted place with an age-old public well that provides water throughout the year.

People from far and right throng the place with cans and drums to fetch the water home, but the Dalit people of the village cannot even dare to go near the well. In an interview by the Hindu, a 61 year old farmer pointed to a distance of about 150 meters away from the well and says that, “the scheduled castes cannot go beyond this point. They and this person says that the Dalits can ask any of us to fetch water from them and we will oblige, but they cannot do it on their own.”

This practice has been there for ages and it cannot be changed - this is something that he states. People belonging to the Kallar and Moopar castes do not hesitate to talk about the discrimination of Dalits even to journalists. The well has been associated with four small temples built close to it and religious sentiments were given as a reason to keep the Dalits away from it.

There is another similar example in Bundelkhand, in Uttar Pradesh's Bundelkhand. We already know that the wells and ponds have dried up rivers have also shrunk miserably and there is a very stark water scarcity - it has actually become a way of life in this particular region. And water woes have been further compounded by the caste woes emerging in these times of water scarcity, as the people who are belonging to the Dalit caste are not even allowed to touch the functional hand pumps that are installed in the upper caste villages of this particular area.

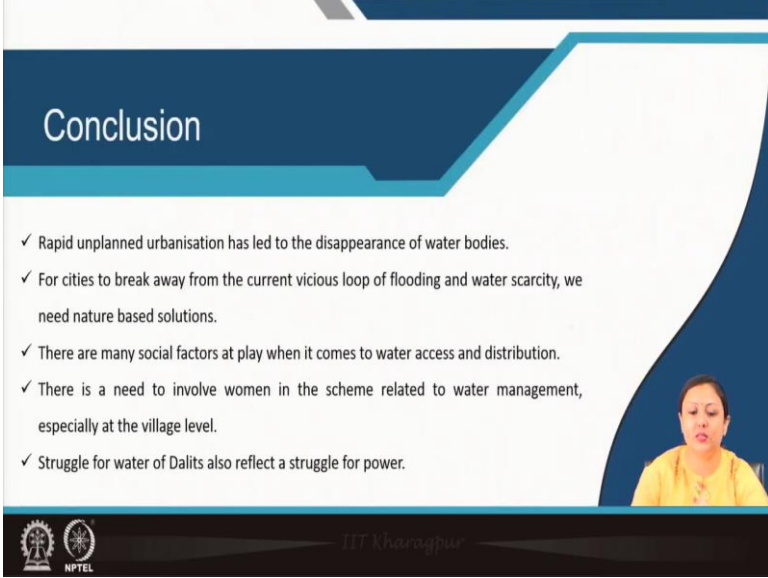
And even if it is seen that in multiple cases that the Dalit children are very ruthlessly pushed back even, they even if they dare to venture around the hand pumps or the tube well that is owned or used by the upper caste members. And in most of these cases, these are the incidents that all the other children it is actually happens in front of them and they

have no other way, but to absorb this caste prejudice and they actually grow up with it and this is how the cycle continues and it gets socially entrenched.

And this is why I was discussing - these particular reasons are very important and we I think that we need to take note of these social dimensions and these blatant social realities, when we talk about the access and distribution to the resources or resource management.

And this would actually help us include the voices of the marginalized - those who are most affected by water crisis in the current decades. And also maybe technology and innovative solutions can help to a certain extent, for the consideration of these social discrimination for ending these kinds of social discriminations and addressing these blatant issues.

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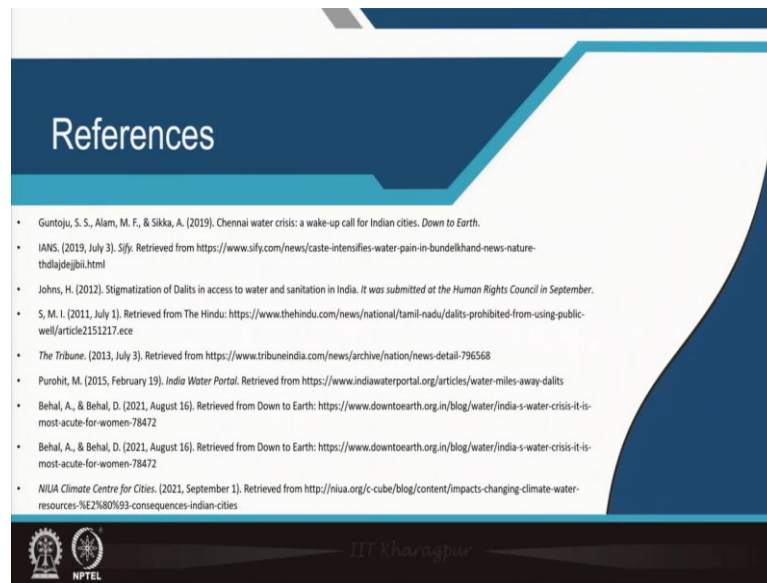
The slide features a dark blue header with the word 'Conclusion' in white. Below the header, there is a list of five bullet points, each starting with a checkmark. In the bottom right corner, there is a small video inset showing a woman with dark hair, wearing a yellow top, speaking. At the bottom of the slide, there are logos for IIT Kharagpur and NPTEL.

Conclusion

- ✓ Rapid unplanned urbanisation has led to the disappearance of water bodies.
- ✓ For cities to break away from the current vicious loop of flooding and water scarcity, we need nature based solutions.
- ✓ There are many social factors at play when it comes to water access and distribution.
- ✓ There is a need to involve women in the scheme related to water management, especially at the village level.
- ✓ Struggle for water of Dalits also reflect a struggle for power.

So, let us summarize briefly everything that was discussed today. A rapid unplanned urbanization has led to the disappearance of water bodies for cities to break away from the current vicious loop of flooding and water scarcity, nature-based solutions are required. There are many social factors at play when it comes to water access and distribution. There is a need to involve women in the schemes related to water management, especially at the village level. Struggle for water of the Dalits also reflect a struggle of power.

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So, all these references that you can see here have been consulted and they have been used for the making of this lecture and we would be passing on these to you. Thank you for joining the course I had both of us I think had Professor Archana Patnaik as well as myself we had a wonderful time teaching this course discussing about the case studies and the conceptual ideas and we do hope that you also had a good learning experience and you would be able to internalize many of these sociological issues around resource management. I hope that all of you benefited from the lectures and you enjoyed the learning process.

Thank you and we will meet during the live session.