Environment in India 2047 | Text Transcript | CIRCLE

This is a text transcript for the recorded event “Environment in India 2047,” presented by the Canada India Research Centre for Learning and Engagement (CIRCLE) at the University of Guelph. The event was recorded on June 8, 2022, and was moderated by Bharat Punjabi. The guest speakers were Mabel Denzin Gergan, Harini Nagendra, and Mihir Shah.

Transcript:

Bharat Punjabi:

My name is Bharat Punjabi. On behalf of the Canada India Research Center for Learning and Engagement at the University of Guelph, I want to welcome you to our India 2047 series. Today's focus is on the environment. My name is Bharat Punjabi, I’m a research fellow at the University of Toronto. We have a very distinguished panel to speak about environmental issues in India but before I get on with our introduction uh which would be provided by Professor Madhur Anand, who's the director of the Guelph institute of environmental research, my role today is as a moderator, and I wish to begin with a land acknowledgement.

The University of Guelph resides on the treaty lands and territory of the Mississaugas of the Credit. We recognize this gathering place where we work and learn is home to many past, present, and future first nations Inuit and Metis people. Our acknowledgement of the land is our declaration of our collective responsibility to this place and its people, people's histories, rights and presence and our school, the University of Guelph, supports and adds a collective voice to the calls to action from the truth and reconciliation committee on Indian residential schools to never forget to hold governments and colonial forces to account to seek redress and healing for injustice.

So, today's seminar, as I just mentioned, is on the environment and it is being hosted by CIRCLE. For those of you who are joining us for the first time, I wanted to describe CIRCLE’s activities to y’all. Established in February 2020, the Canada India Research Center for Learning and Engagement is an interdisciplinary nucleus in Canada for cutting-edge research on the Indian diaspora and to showcase, advocate, catalyze, and foster an equitable, respectful, and sustained exchange of knowledge between Canadian and Indian scholars on complex and emerging topics related to sustainability and social and economic well-being. I’ll be sharing the link to CIRCLE's website through the chat function soon.

I’m also going to take this opportunity to inform you all about upcoming events. Professor Bina Agarwal to the university of Manchester and Mr. Vika Swarup from the Indian Ministry of Foreign Affairs will be receiving honorary degrees from the university of Guelph next week and as we are going back to in-person convocations. CIRCLE is hosting celebratory receptions, everyone is welcome. We are also going to have conversations on Slumdog Millionaire with Mr. Vikas, which Professor Anand and Rima Patel will be hosting on the 15th at the Bookshelf. The last of the India 2047 series is science in India on 6th July, same time as today. Please check our website for details and we look forward to seeing you in some or all of the event.

So, today's event as you know and if you've been through the bios of our panelists is one of our very interesting events, given the kind of relevance of the environmental issues and due to climate change, all our three panelists have a mix of policy, academic, and activist experiences—activists in the environmental sphere in India and that informs their work greatly. As someone who works on urban environments or followed their work very closely, all these three speakers are no more than 15 minutes each and then we'll be leaving about 25 to 30 minutes for question and answers. We aim to finish in 15 minutes.

So, everyone will be on mute when we have the webinar and no video. The question-and-answer session will be handled by me as the moderator; you can raise your hand, click on the icon at the bottom of the screen, or you can type your questions. Please keep your questions, comments brief and I'll be doing my best to relay your questions to the panelists. So, at this point, I also wanted to tell you all that this event is being recorded. I now pass on the platform to Professor Anand to give elaborate introductions to our very distinguished panelists. Professor Anand.

Madhur Anand:

Thank you, Bharat. For some reason my video has been disabled by the host so hopefully that can be turned on again, but I am here so I'll just start via audio. So welcome, welcome everybody. I am Madhur Anand; I'm serving as the current director of the Guelph Institute for Environmental Research, and we are so thrilled to sponsor this event that is being run by CIRCLE.

The Guelph Institute for Environmental Research, or GIER, is an institute that involves all of our seven colleges at the university, and where we are seeking to support intersectional and interdisciplinary approaches to solving some of our world's most pressing environmental concerns. I am absolutely looking forward to hearing our speakers today and to sharing these with our researchers working on environment across the university and elsewhere.

Just going to check in again with our hosts to see if we can start the video, which would be ideal. Yes, there we go, here we are. I have the pleasure of introducing the three speakers today for this panel on India and the environment in 2047. Our first speaker is Mabel Denzin Gergan, who is a geographer by training and her research focuses on post-colonial environmentalism, tribal Indigenous theorization, anti-colonial politics and race and ethnicity in South Asia.

Born in Sikkim, India, she has lived and worked extensively in the eastern Sikkim and western Himalayas. More recently, she has collaborated with scholars working on Indigenous politics in North America, British Columbia, and the Navajo Nation, focusing on Indigenous youth activism, infrastructure, politics, and decolonial futurity and she joins us today from Nashville.

Our second speaker will be Harini Nagendra who is director of the research center and professor at the Center for Climate Change and Sustainability at Azeem Premji University. Doctor Nagendra has conducted 30 years of research examining social ecological transformations in south Asia's forests and cities. Her books including Nature in the City,

Bungalow in the Past, Present and Future, and Cities and Canopies: Trees and Indian Cities and she has received several awards including the US National Academy of Sciences 2009 Coscarelli Prize and the 2013 Eleanor Ostrom Senior Scholar Award. She also writes mystery fiction set in the 1920s colonial Bangalore, with the first book, The Bangalore Detectives Club published very recently in May. Welcome. She joins us from Bangalore.

Our next speaker will be doctor Mihir Shah, distinguished professor and chair at the Water Science and Policy Program of Shiv Nadar University. Doctor Shah is a leading scholar, activist, and policy maker on water management and royal livelihoods in India. From 2009 to 2014 he was a member of the National Planning Commission handling water resources, rural development, and decentralized governance. From 2019 to 2021 he chaired the Government of India's committee to draft the new national water policy.

For three decades now Shah has lived and worked in India's Indigenous communities, in the remote hinterlands of central India, forging a new paradigm of sustainable development. He joins us today from this hinterland, from a small village named (indiscernible). So welcome to all our speakers and welcome also to all of our participants. I really look forward to today's talks and discussion. Thank you.

Bharat Punjabi:

So, Mabel you'd be going first. Thank you.

Mabel Denzin Gergan:

Thank you for that introduction. Thank you, Bharat, and Madhur, for the invitation to this panel. I was invited to this panel to take stock of India's journey during the past 75 years, celebrate this momentous milestone, offer a vision, a roadmap, and the work to be undertaken in the next 25 years. I'm going to put a timer so that I don't overshoot and I'm going to be reading from my notes.

Here in this presentation, when it comes to indigenous rights in 2047, I argued that Indigenous youth and I focused specifically here on educated Indigenous youth, despite their lack of institutional power and resources, offer an important vantage point given how clearly, they articulate their visions for their communities' futures. My talk today is based in Ladakh and Sikkim in the Indian Himalayan region. Both places have a high concentration of India's (indiscernible) tribe populations that is constitutionally recognized at tribal groups. For the purpose of this talk, I will refer to them as Indigenous, a category that is not recognized by the Indian state, but is still widely used among tribal and Adivasi activists and academics in India.

In this talk, I consider the future of Indigenous rights in India through the lens of Indigenous youth from (indiscernible) and Sikkim who have to contend not just with the grand geopolitical drama between India and China, but also with the drastic impacts of climate change occurring across the Himalayan region. In the Indian Himalayan region, alongside climate unpredictability, recent years have witnessed a steady escalation of geopolitical hostilities between India and

China. This has raised fears and anxieties among borderline populations, especially in places like Radka and Sikkim where my research is based.

The last few years have witnessed numerous standoffs between the Indian and Chinese military and as a still unfolding global pandemic continues to destroy lives and livelihoods across the region, especially for Indigenous groups, it is hard not to imagine the future of the region in apocalyptic terms. Here are some kind of snippets from many news reports about the future of the Himalayan region and studies that tell us that climate change will turn one third of the Himalayan peaks to bear rocks.

But at the same time, you have this geopolitical attention that is unfolding in the back it was the (indiscernible) valley clashes in Sikkim, it was the Doklam valley Doklam clashes. This was something that I've been keeping tabs on. It's not just about Sikkim, there's also these tensions are natural. So, I consider all of this, both the geopolitical dimensions as well as the climate change and the ecological precarity that young people have to contend with. How do Indigenous youth respond to this intersection of concerns and what might their responses tell us about the future of Indigenous rights in India?

I address these questions in brief of course by drawing on two examples from research projects based in Ladakh and Sikkim. The first set of young people that I work with are from Sikkim and more precisely from Dzongu, Sikkim. I'll show a map of Dzongu in a bit and where it is located in Sikkim. Dzongu in north Sikkim is a pre-colonial reserve for Sikkim earmarked prosecutors Indigenous Thatcher community since the late 2000s.

Dzongu has been a site for a very successful anti-dam movement that was led primarily by educated young people from the reserve. My PhD research that began in 2010, and that was building on my master's research in tests that I did in 2008 studied how lecture youth involved in anti-dam activism understood their relationship to their land and community in the face of heightened ecological and economic precarity.

In addition to these dams, in 2011 there was a 6.9 magnitude earthquake near Dzongu and under two construction hydropower projects. People started connecting earthquakes and hydropower projects and this infrastructure developed in them disastrous hydropower. In the Himalayan region, particularly in Sikkim, where earthquakes and landslides are very common, threatening regional ecology along with visions of sustainable livelihood opportunities like ecotourism that many of the young people from Dzongu talked about as a future opportunity for them.

In Ladakh, my project is with young people who are college students who left Ladakh due to lack of educational infrastructure. Most of these young people were studying in major Indian cities but some were also studying abroad in the US with the help of fellowships. I don't have time to get into what happened in 2019 after article 370 was revoked, and Ladakh became a union territory but I’m happy to talk about that later in Q&A.

So, in Ladakh it is the lack of political autonomy that is understood as a primary reason for the regions under development for young people. This underdevelopment translates to the lack of educational infrastructure that leaves them with no option but to leave the region for higher education. I see my research in Ladakh and Sikkim trying to make sense of two kinds of movement. On the one hand we see an intensification of development interventions in the region that is making the region more vulnerable to climate change. On the other hand, we find growing number of young people leaving the region from metropolitan Indian cities due to the lack of education and employment opportunities of the region.

What unites the young people in Ladakh, and Sikkim are that both these young people sit at the margins of both the community and the state. Since they left home for education at an early age, some people leaving are very young for hire, especially the young people from Dzongu who had to leave Dzongu to go to other parts of Sikkim like Gangtok, the more urban parts to study, some of them left at a very young age.

When these young people try and return and integrate into the community and express opinions on local politics or the way things should be, they're often ignored or seen as naive and have very little institutional resource of political power to enact their visions for their communities. While their visions for the future are not above critique and many academics may not even consider these young, educated people the ideal Indigenous subject because of their education, uh their familiarity with social media, English and their social mobility.

However, these young people, because of how articulate they are not viewed as authentic Indigenous voices who cannot responsibly represent their community's excavation. I argue here that this desire for authenticity reproduces very troubling colonial tropes of tribal subjects. Instead, I point to how young people, even though they sit at the margins of the community and the state, offer very important and crucial road maps and visions for the future. Here I provide two small examples from the activism and art of Indigenous youth to provide a glimpse into how they imagine a future for their communities.

I begin with Sikkim. Sikkim was a Tibetan Buddhist monarchy ruled by the Namgyal dynasty till 1975 when it was annexed by India. Lepchas, along with the (indiscernible) are considered Indigenous to the region of Sikkim which Sikkim, prior to British colonization, included the Darjeeling district of west Bengal. The British were sympathetic towards the lepchas but saw them as a dying race. I asked one of the young people who was um, let me just go back a little bit. The British were sympathetic to those lepchas, but they saw them as a dying race that would be replaced by the more aggressive communities like the Nepalis.

And aggressive in courts here these are all colonial troops of communities and the Nepalis or actually the Mali communities was actually brought in by the British who encouraged them to settle in Sikkim and in the surrounding region to work on tea and carnival plantations. Lepchas were labeled as a vanishing tribe by European missionaries and ethnographers who arrived with the British in 1816. This is still a widely popular understanding even among many lepchas however, for the lecture youth involved in the anti-dam movement, it was important to counter this understanding.

In the early days of the anti-dam movement, I asked one of the young people who was supporting the anti-damn struggle what he thought of the vanishing tribe label. Dashi called a student, an anti-damn activist, was critical of this discourse of the vanishing tribe and asserted that I think this vanishing brand is given to me given to us to make us feel weaker because people succumb very easily when they feel they're inferior. He further argued that the presence of Lepcha is not only in Sikkim, but in west Bengal and even in Bhutan and Nepal. One could not say that their tribe was vanishing. Here is a map uh that is taken from oral histories of the Lepcha community that imagines the actual, the territorial kind of the range of the Lepcha community.

In this way lepcha youth assert ties to the land, but in doing so, exceed the territorial boundaries of the Indian state. That points to how the process of nation building has often led to the reduction of Indigenous territories and often place them at the intersection of these geopolitical tensions between these (China and India in this case). In Himalayan states where conservation and biodiversity programs often take precedence over Indigenous access and use of their own lands even within the nation state boundaries, Indigenous rights have been severely restricted.

However, we still find communities like the Lepchas pushing back. The anti-dam protest not only resulted in the cancellation of four out of seven dams planned within Dzongu, it also led to a cultural revival leading many Lepcha youth to show interest in their language and other facets of their cultural heritage.

Okay now on to Ladakh. Much like Sikkim, Ladakh is a former Tibetan Buddhist kingdom. Ladakh was invaded by the Dogra army in the 19th century and incorporated into the Prince's State of GNK, which then became part of India in 1947. Of course, not without controversy. Both British and Dogra officials cast Ladakh’s as primitives, superstitious and immoral. And illustrate a quote here that no doubt draws pre-colonial tropes of native groups. British colonial officials and their local Indian appointees saw Ladakh as remote, backward, and a backward place in need of upliftment and integration.

And Ladakh as quote incapable, Ladakhi’s as incapable of participating in decisions about their own future. The Ladakhi youth I work with push back against these strokes of backwardness through their art. In the following art piece that is titled Mountains are the True Ancestors (you can read the description for more details), we get a glimpse of how young people reiterate their connections to the land and the ancient history of the region. In this case through their understanding of deep time.

This image is an art installation by Chemat Dorjee Ladakhi artist that imagines Ladakh in this geological past when it was under the ocean. So, it thinks of this idea of how the Himalayan region rose above, rose slowly, and how for the Ladakhi people the mountains are their true uh ancestors.

So, in this art piece, Chemat has used petrol eclipse that are scattered in different parts of the dock and here the use of petroglyphs as evidence of the prehistoric connection to the land

offers a way of seeing in the landscape not just as a resource but as an archive of Indigenous heritage. In both Ladakh, in both Ladakh and Sikkim, we find young people reaching back in time to draw and reassert their ancestral ties to land and their region more broadly. In doing so, they push back against widespread notions that Indigenous communities in the Himalayan region, and India more broadly, will not survive the onslaught of development and modernization.

The Sikkim have similar histories in that they were both Tibetan Buddhist monarchies. Today, both regions are seen as exotic, beautiful, touristy sites but the place and its people are simultaneously understood to be backwards in relation to the rest of the country. Young people in both contexts articulate a vision of the future where they will have a greater say in centralized forms of decision making and governance that currently exclude them and their communities.

Hopefully through these two examples what I've tried to demonstrate is that young people are important political actors but we won't find their contributions if we look only in institutional or official spaces since they are not invited in, but listening to their demands, desires, and visions of the future opens up a roadmap of the future, but not with one path but many paths that are yet to be determined. I'm going to wrap up here. Thank you so much for listening.

Bharat Punjabi:

Thank you, thank you professor Gergan for a very insightful lecture on a very important part of India and I'm sure we're going to have, I have many questions on your talk and I'm sure there are going to be other questions as well. On that note let me welcome doctor Nagendra.

Harini Nagendra from Azeem Premji University who's going to talk about the future of Indian cities. The title of her talk is "India's Cities in 2047: Climate Smart or Ecologically Foolish?" You know given that our work has been on Bangalore but also other Indian cities, Professor Nagendra is going to provide us with a vision of what India cities are going to be like in the future. Thank you.

Harini Nagendra:

Thank you. It's a pleasure to do this and it's a hard task to follow on Mabel's wonderful talk but I'll try. So, I'll keep an eye on my time too, but I just want to start with a bit of a background on why India and why Indian cities because one of the things we always hear about India is that it's a predominantly rural landscape. Yes, that's true, fairest projections say that the world will be 75 percent urban by 2050 and here's a UN world urbanization prospects map from 2014. And what you can clearly see is that the reds and the yellows, which is the fastest growing cities, are all in the global south.

India definitely has a very large fraction of these. Along with Nigeria and China, India will account for 35 percent of the urbanization that will occur by 2047 or 2050. But urbanization in contexts like India and Nigeria in the global south is really very different from the global north

in many ways, if you look at this, for instance, it's a nightlight satellite image, you can see India south Asia actually and you can see the US.

Pink is shrinking cities and blue are growing cities and you can really see that most parts of south Asia have growing cities and very large sections of North America actually have shrinking cities. As we know well much of Europe actually has a problem of shrinking cities, definitely large parts of eastern Europe, and so the kind of context we are talking about when you think of Indian cities.

India already has three of the world's 10 largest cities. It also has three of the world's 10 fastest growing cities. And the kinds of population densities the rural urban connections, the hinterland impacts of urbanization, they really mean that we need to start when we start looking at India's sustainability in 2047, we have to take cities into very important account because and we have not done that sufficiently in a national scale because our predominant imagination of India so much as a rural city.

What is different about places in the global south cities in the global south? It's not just that they have higher open growth now so this is from a study we did of cities across the world and what we could show is if you look at the green which is cities in the global south, this is a box and you can see that green always has a higher percentage growth of population than blue, which means that global south cities have always been growing faster, they're always denser, they've always grown faster.

They also have very different social and environmental contexts looking at global data you can see that whether you look at issues like youth unemployment, or under five mortality rates, or rates of poverty the percentage of slum households' access to water, polluted air. In all of these contexts, the global south is very different and there are regional differences right. Africa is different from Asia, different from Latin America, so this sort of analysis tells us two important things.

One we need to understand the context of cities in the global south, but two we can't paint them all with the same broad brush, which unfortunately people do by saying okay I have a global south city, let me just apply it to all global south cities. The context is very different from region to region.

Unfortunately, if you look at the data, we also did this analysis at the same time looking at the top thousand cited papers in urban sustainability in a decade looking at 2008 to 17. What we found was that most of the papers, 70 percent of all the top thousand cited papers, come from north America and Europe. Between them they account for 70 percent of the papers. If you leave China out because China has a peculiar urban context that is quite all its own and really research on that context is very different from how cities grow and function in other parts of the world.

But let's look at global south-like context. South Africa you have seven papers, India you have tens of 0.1 percent and other section regions of the global thought 257. So what does this

mean? This really means we are trying to look at how to manage Indian cities on challenges of urban sustainability using academic literature of which 1 percent comes from India. And that's why theories like smart cities which are developed for western context which fit maybe western cities if they do better than at least definitely better than Indian context get taken an applied whole scale while methods of inquiry get taken and applied whole scale to cities like Indian cities. So, we really need a lot of research on urban sustainability context in India.

If you want to understand how to configure Indian cities in a better way to make them to think of them as really social ecological systems which function as cohesive walls where people have a different imagination. That of city building that is not based on skyscrapers or for instance Bangalore being another Singapore but tries to look at Indian cities as following a uniquely Indian imagination and one that is grounded in the Indian social-ecological context and that makes India sustainable.

This is the challenge. It's not easy by any means by 2050, 2047 take whichever year you want. India will have 60 percent of its population living in cities, 415 million new people would have moved to cities by 2050. 1800 people right now move to an Indian city every hour and by 2050 2047 just three cities, Delhi, Mumbai, Kolkata will account for 100 million people. So when you're thinking at that scale how do you even plan for a sustainable city? Is that possible? We do have climate change coming, we have biodiversity impacts, we have pollution, we see crises all around.

So, in the next part of my presentation, I want to do a deep dive down into one city that I have been working on for the past 15 years. My city Bangalore. The red dot right at the center is (indiscernible) original Bangalore which he founded as a market town in 1537. I've done a deep ecological history of changes in the city if you look at this growth in the city till 2007. Of course, the city's grown beyond that in terms of administrative boundaries, it's doubled every few years and so the doubling has added much more area each time.

As the time period between (indiscernible) shrinks right so now it's a huge city it has about 12 million people about 750 square kilometers but it's an unusual old city because it has ancient civilization. We know that there were megalithic stone tombs that tell us people were there in 2000 BC thereabouts but there was nonperennial system of water.

It's a dry, semi-arid region where there is no current, no source of water. It's not close to the coast so what people did was they came in and created a favorable aspect, a favorable nature of which they engineered the ecosystems really to support them. So, they created lakes or tanks which are really rainwater harvesting structures by scooping the mud we know this from old inscriptions. They cleared the jungle, scooped out the mud and created or deepened natural depressions on the ground which were then used to store water which supported civilization and villages.

These were created not just by kings and rulers but by common people for the support of animals, cattle, birds, service of the goddess for dharma, for themselves, for dharma for their future generations. So, it is very much a service-oriented activity to improve these lake

landscapes and they were common landscapes. This is very important. They were landscapes that serviced agriculture, foraging, grazing, cultivation of firewood. There were woodlots around these places, there were wells, it was not all homogeneous and happy times. There was a huge amount of caste labor involved in this and horrific stories of human sacrifices sometimes forced human sacrifices of women, infants, and people from oppressed class.

So, when I say common landscape it's not to remove that part of the caste injustices, but it was definitely a landscape which where ecosystems were common and for communities. This continued till the British took over and this is map from 1791 when the British in the third Anglo Mysore war briefly held Bangalore for a couple of years. You could see that there was a lot, there were a lot of water bodies, there were a lot of trees that were planted.

By 1888 when it was a British area, they had many more water bodies and many more trees so as people moved into the city, they really started planting many more trees to improve the climate and this continued to the 1890s and creating more water bodies. But by the 1890s this began to change. The first pipe to water systems came into the city; they started getting water from outside. This replaced local water supply and once the local loop of dependence was lost people stopped taking care of it, of the water bodies and they started considering them polluted uh sewage filled cesspool cesspools of waste and malaria and other kinds of disorders.

They started to fill in the lakes and build malls, bus stands, apartment complexes, they became valued as real estates and trees were also cut so you've seen a lot of trees planted by 2015. Only one water body remaining in the heart of the city a few at the periphery and this is the old city of course in the new parts of the city you still have a lot of water bodies that are protected and then you find trees getting cut in the tens, thousands, millions since 2010. So, what does this tell us about the future of the city? The one place where we can talk about the future of a city like Bangalore is based on its civic action.

Bangalore has a very strong environmental movement, which is a public movement, which cuts across different groups of people. One example is a steel flyover Beda, which was a hashtag on twitter, where the government was trying to build a steel flyover in an area where there was no traffic data. That justified the existence of the flyover because of the social media movement and on protests and surveys including ours which was a very prominent survey that we did of the trees that would be affected, on the impacts on climate change and pollution and heat waves. The government finally decided to pull that steel flyover right and similarly lake restoration movements have been very widespread in the city.

This is Kaikoura Lake, a lake near my house, whose restoration I was part of. This is with a community group and the lake now which is extremely polluted is home to over 150 different bird species and an incredible biodiversity oasis in the heart of the city. Right, so that's on the good side. But on the flip side, the urban commons part of this is completely gone. Urban Commons in the city supported food security there. We still find in a very recent study we found of just 200 households they could describe 70 to 76 species that they forged and bought and uh 47 percent buy or use forage species and 42 percent would like to forage more, but the commons are being gated and protected in the city and they have no access to them.

Ecosystems that are commons are important because they're very important for migrants who use them for nature worship, for mental health, for play, you can see these children playing below the trees, and for worship and resilience of all kinds. We found they're very important modes of environmental place making because when migrants, wealthy or poor, come into the city they come to a restored lake or restored urban grove and see a tree or a bird species that they recognize from their local area.

For instance, a gentleman from Assam looked at migratory cranes and said that this reminds me of my time at the Assam barrage and therefore I now think of Bangalore as my home. Or someone else from Andhra Pradesh said celery reminded him of his home so these places are very important for migrants to assimilate into the city, start working on places for environmental protection and start creating areas that they can actually work in to protect the city which means these lakes should be commons but they're not.

You can see a fence here to keep out the cows, you can see a sign here from the municipality that says flower plucking is prohibited, swimming is prohibited, damaging trees is prohibited. You can't extract anything, and you see slogans like this in movements across the city which says that Bangalore should become Singapore and we don't have places for grazers or this imagination of people who are fodder collectors, grazers, fishers who also protect the lakes in this modern city anymore. So yes, there is a place for environmentalism in Bangalore and cities like Bangalore, but what does it really mean for the future?

Now zoom out from Bangalore, I want to move to other cities so, for instance, if you look at the IPCC report, these stresses and urban ecosystems are not just going to be because people are cutting down trees and filling in lakes and water bodies and polluting them. Climate change is going to be a game changer. Heat stress will dramatically increase the number of cities affected by climate change. Many of the coastal cities like Mumbai for instance, will be flooded. Large parts of the financial capital of India, the core of Mumbai, will be flooded by 2050, yet cities like Mumbai or Trivandrum go ahead with building airports on wetlands at the coast which are going to get flooded in 20 years from now. So, if that is not being climate blind and ecologically foolish, I don't know what is.

I'll conclude with one analysis we did of climate resilience in cities in India and across India there were state action climate action plans, and they were devised, and they have not…not a single one has taken off. Now there is a plan to revive them and build new state action plans but perhaps, I think the one lesson we can look at from C40 cities and movements like this across the world is that if there is any hope for climate action, it has to be done at the city's level with cities and mayors taking the lead.

We do know C40 cities is active in some cities in India, whether that be a game change or not we don't know, but if you look at climate action plans across India, and we looked at a number of them, we tried to analyze what kind of changes, what kind of plans they have. And they do talk about nature-based solutions, which means ecology, but it's not nuanced, it's not in the right place.

For instance, they would talk about tree planting as a solution, but that tree planting could be eucalyptus on the Yámana riverbed, which is not going to be really a solution for climate change. It is largely technocratic. There is no active, almost zero active involvement of community solicitors. I'll end with one heat action plan, which is supposed to be incredibly successful in terms of the numbers of lives it has saved but all it really talks only about adaptation to climate change as in getting people out of the heat and into cool areas.

But Ahmedabad has water bodies, it has trees, all of those should be part of the action plan because you also need to mitigate climate change and our own research in Bangalore has shown that if you have trees planted that reduces the surface temperature of the road by as much as 35 to 40 degrees centigrade. And it reduces pollution. You can half suspend particulate matter levels in the city, so these nature-based solutions ecosystems as commons need to be really a very core part of any kinds of climate change adaptation, otherwise you risk being ecologically foolish.

I'll end with one beautiful image that an undergraduate student who was working with us as an intern Rohit raag drew of his version of what would be an ecologically smart city in India. You can look at the level of rich detail in this and this is really what our cities should look like in 2047 if we want to be ecologically intelligent cities. I'll end with the two books that I have which give you more details on this and I think I'm exactly out of time so let me stop.

Bharat Punjabi:

Thank you, thank you Harini. Very insightful presentation and giving us a very good synoptic view of what has been done in Indian cities and what is coming in the future in terms of climate change, action plans, etc. We already have quite a few questions, which I'm going to post to you in the q and a section.

Our next speaker is Professor Mihir Shah, a distinguished professor at Shiv Nadar University, and someone who's actually a lot of experience on the field and policy and now heading a very important committee for the Indian government to reform water governance. Professor Shah will be talking on a very important subject which is the water crisis in India and what the vision for water management in India would be in the future. The title of his talk is "Water in India 2047: Drawing the Right Lessons from the Past." So, Professor Shah, you can begin please. Thank you.

Mihir Shah:

Thank you, I'll share my screen. You can see and hear me properly?

Bharat Punjabi:

Yes, yes, we can.

Mihir Shah:

Okay thank you. So, this is the title of my talk, as Bharat just told you. It was mentioned earlier that I'm actually speaking to you from a remote tribal village in central India and a lot of what

I’m saying today is what I have learned by living and working with the people in this region over the past three decades. And the most important thing I think I have learnt is that contrary to popular belief, India is actually a water abundant nation, extremely rich in the resources that nourish a sustained supply of water.

Now what are the elements of this abundance? The fact that India gets more than a thousand millimeters of rain every year, that the Hindu Himalayas and the Tibetan plateau are a source of 10 major river systems that provide water to nearly 2 billion people in India and its neighborhood, we have richly forested catchment areas throughout the country, and we have among the largest aquifer systems in the world.

It must however be recognized that the crisis of water is very real. It is estimated that with business as usual if we continue to misgovern water as I’ll just describe about half of the demand for water will already be unmet by 2030. So, we don't have to wait till 2047, by 2030 already the crisis would have reached almost unimaginable proportions. Already in around 60 percent of India’s districts, we find water tables falling or and it can be both or either water quality issues very serious water quality issues like finding nitrate, uranium, arsenic, and fluoride.

And this is as I said in as much as 60 percent of India’s districts. A recent scholarly work on 55 catchment areas in the major river basins of India shows a decline in the annual runoff and mind you this is normalized for rain, so the decline is not because of lesser rainfall in that year, and this includes Godavari, Krishna, Mahi, Narmada, Sabha, Mati and Tapi. You couldn't name more significant rivers than these, especially in peninsula India and it is projected that if this trend continues these rivers will soon run dry.

Climate change, as we've been hearing from the previous two speakers, poses major challenges because, as they say, stationarity is dead, which means simply that assuming that the past is a useful indicator of the future is no longer an assumption that we can make so we need to factor in all these important elements of the water crisis because without doing that, the conflicts over water are becoming more and more acute and more and more difficult to resolve every passing day.

So, this is some of the graphic presentation of what I just said. India is the world's largest user of groundwater. If you take China and the USA number two and number three position you add their consumption of groundwater, it is still less than what India consumes in a year. If you take the map of India, you can see clearly the really serious pockets of falling groundwater levels and quality and this is now getting extended throughout the length and breadth of India. You take a detailed study on the Mahanadi River basin, and you see the decline in the normalized base flows over a five-year period, so what I said about so many river systems is true of Mahanadi.

Through this study, we can find this photograph actually in some ways captures the tragedy of rivers in this holy land of rivers. We are the people who are supposed to think our rivers are sacred spots for holy dips and this is the site of India’s second largest river, Godavari which is the most important site for the holy dip. This is the kind of situation they have reached in our

country. In a graphic form, this is a study I had done. It was, which is actually on the Punjab water syndrome, but this is a synoptic view of the kind of water crisis that India is going to face well before 2047. So, what is this? Is this a paradox of plenty? Is it that we have a lot of water? But then why is there a crisis? Well, the simple explanation is poor governance and management.

We have invested US dollars, 50 billion, in large dam projects but I'm leaving aside the discussion on whether these dams should have been built in the first place or not. The conflicts around these dams, the very huge fact, is that trillions of liters of water stored in these reservoirs are not reaching the farmers for whom this water is meant, and we have overlooked the fact that nearly two-thirds of India is underlaying by hard rock formations. The fact is that hard rock formations have a very low rate of groundwater recharge and we have applied the same technology across the length and breadth of India to extract groundwater from great depths, ignoring the fact that groundwater is a shared common pool resource.

Consequently, what has happened is that what is the most important solution posed by policy makers for India's water crisis that is border irrigation has now become part of the problem itself. This is kind of a vicious, infinite regress that we are finding ourselves in in the sphere of groundwater and if you look at the single most important factor explaining falling water tables, water quality, and even the drying up of India's rivers, it is the unbridled competitive individualistic extraction of the common pool resource that is groundwater and what we have done.

We have ignored the great diversity of India, which is our strength, but we have converted it into a problem because we find (as far as groundwater extraction is concerned and the nature of the aquifers is concerned) there is this huge diversity that we find across the country and we have applied one size fitting all and that itself has created a problem of water where there need not have been one.

So, what are the solutions? Where do the solutions lie? What is to be done? If in 2047 we can say India will not have a water problem because I am claiming that India is actually abundant in water resources so, then what we have to do is to totally reject the very foundations of our water policy. I've had the chance to share important committees to push this new agenda, well this is what I'm sharing with you today.

The first element of this complete transformation that we need is that we have to address the demand side. We have to stop obsessing with endlessly increasing supply, whether it's a question of water or it's a question of energy, we cannot continue on this supply side syndrome because that ultimately is a mirage. We have to leverage and not be blind to (as we have been in policy so far) leverage the links between catchment areas aquifers rivers and water supplies.

We have to adopt the principle of subsidiarity, which simply states that look for solutions to problems closest to where the problems exist on the ground and involve the people who are there, who are facing the crisis in the most brutal manner, and they can be part of the solution. We have to reform water governance by bridging the silos into which we have divided water

and by adopting a transdisciplinary perspective towards water. Finally, given the context of climate change, we have to build in resilience, agility, and flexibility into our water policies. So, my talk will briefly try and explain what I mean.

In this short slide, the largest fact about water in India is that 90 percent of our water is going to the agriculture sector, but what people sometimes ignore is the more important fact that 80 percent of this irrigation is being taken by three water guzzling crops. These are wheat, rice, and sugarcane. Now why do farmers continue to grow these crops even in water short regions? The reason is simple. Public procurement by government is focused on wheat and rice. More than 95 percent of India's procurement, government procurement operations where they purchase the grain from the farmers, is still, after 50 years of these procurement operations, it is still centered on wheat and rice and the private mills, the sugar mills are buying sugarcane.

The solution that I am proposing is that we introduce low water requiring millets, pulses and oil seeds into the public procurement system and include them in our child nutrition programs. India runs the largest child nutrition preschool and school programs, and if we can do that, it provides a huge demand for the farmers to actually then be incentivized to grow these crops which are far more location specific, agroecologically appropriate, for many diverse regions of this country and simultaneously would also provide a solution to the terrible crisis of malnutrition and even diabetes that we face across the length and breadth of India.

We could actually very quickly solve India's water problem if we were to shift the cropping pattern towards more location specific crops, which require much less water. We also need to move towards location specific agroecological farming. This reduces the use of chemical inputs, improve soil. Organic carbon, carbon sequestration, is the kind of mantra all over the world for combating climate change, but we don't realize the most powerful way of doing that is to actually resuscitate our soil resources and which have been destroyed through the technologies employed since the green revolution for the last 50 years.

If we improve soil structure, if we change towards a chemical free farming system, we can provide huge economies in water use. I recently did a research paper on this which shows we studied 10 states across India, the most important water consuming states of the country, the most important irrigation states of this country, and we showed huge savings in water by just a shift of about 25 percent. We need to shift towards a participatory irrigation management system.

We focus on maintenance and last mile connectivity if we have shown actually this is a study by the Nithya which shows that 24 million hectares can be added to irrigated area without building a single new large dam and this is an enormous potential. A low-hanging fruit which we have not tapped into. We of course avoid therefore the tragedies of human displacement and environmental destruction, and we find that this is a solution which has already been tried and tested on the ground.

With empowered water users' associations effectively managing the water under their control, they ensure that water reaches the tail end areas of the command, and farmers are willing to

pay for this service, which helps meet the operation and maintenance cost, so it's entirely financially and socially sustainable.

As far as groundwater is concerned, we have a huge number of groundwater structures. 40 million groundwater structures cannot be managed through a licensed quota permit. We have to, again, rely on the wisdom of the local people once they are informed about the nature of the aquifers in their areas, so location specific participatory active management. A million farmers have already shown this proof of concept on the ground in the states mentioned in this slide.

What we need to do is demand side management, crop water budgeting and groundwater recharge, which will enable us to preserve and make best use of groundwater throughout the 21st century. This last bullet is actually a title of a paper which was inspired by my work on groundwater management as it says don't kill the goose that lays the golden egg.

Let's not become extreme environmentalist that we don't use the groundwater at all, let's not become guzzlers of groundwater, let's have the goose and the golden eggs because groundwater is simply the single most important natural resource that India is blessed with. For saving our rivals, it's very important to understand the critical relationship between the catchment areas. The health of a catchment area determines how healthy the river will be from where it catches its water.

We again speak a lot in our country about the medicinal properties of the water flowing in the Ganga River, but we forget that unless we protect the Himalayan catchments that our first speaker was speaking about earlier, we have to protect where the medicinal properties of the Ganga come from. They come from the kinds of rich biodiversity, which is medicinally so powerful, which is found in the catchment areas of the Ganges.

Sometimes when I give this example, my younger generation students are much more attracted towards cities like New York, where I quickly mention New York because people of the city of New York manage this water supply through an enormously long process and a difficult process of negotiation with those living in the watersheds of New York City. Once the city decided to pay for the ecosystem services provided by the people who live in the catchment areas of New York, they were able to enjoy clean and green water. So, this is the kind of blue-green infrastructure which my previous speaker was just speaking about.

We have defined infrastructure today as equivalent to cement, but we have enormous reserves of blue-green infrastructure, even in our urban areas, and this is already happening in different parts of the world. I think India needs to join and learn from these experiences, otherwise it will be too late for our cities. What we also need to do is to fundamentally reform water governance in India. I sometimes say that Indian governance of water suffers from three kinds of hydro schizophrenia, which means we have divided water into silos.

Silos of surface water and groundwater irrigation, and drinking water, and water, and wastewater. Unless we integrate our drinking water plans with source protection and

regeneration, what will happen is that the huge piped water schemes, into which the government of India is currently investing, they will be in real danger because the same aquifers which are going to feed this water supply system are being used for irrigation, and unless irrigation and drinking water talk to each other and work with each other in tandem, soon all these sources of water supply for domestic use will run dry because they will be taken away by irrigation.

Irrigation uses disproportionately more water than domestic water. Similarly, unless the surface and groundwater professionals work together in a river basin perspective, the drying of India's rivers will continue, and unless the water supply schemes are integrated with the wastewater treatment schemes, we will continue to have polluted water entering the supply systems of water in the mainstream. We also must realize that water governance in India has been dominated by just two academic disciplines, that is engineering and hydrogeology, but unless we have social sciences and management, there is not a single water department in India either in the center or the states where we have a social scientist working.

Unless we have social science and management, we cannot speak of the participatory approaches towards surfacing groundwater management, river rejuvenation, and conflict resolution which India desperately needs. Unless we have agronomists working in water departments, we will not be able to affect the kind of changes in cropping pattern that I am talking about, and improvements in water use efficiency required to reduce the demand for water, unless we have ecological economists, we will not be able to understand the value of the ecosystem services that we are systematically destroying.

By not looking at the health of our catchment areas and without river ecologists, we will not be able to do river rejuvenation the way we need to in India. When I think of water in India in 2047, all I can ask is the question, will we continue to refuse to learn? My claim is that India can meet all its requirements of water for domestic use, irrigation, urban areas, and industry by 2047, but this means that we give up our insistent refusal to learn from 75 years of experience. The new knowledge that has become available in these 75 years is also the unprecedented circumstances of the Anthropocene, in which we find ourselves today.

For the last 10 years, since the 12th five-year plan was drafted in 2012, the Mahesh committee report in 2016, and the new national water policy of 2020, all of these documents have outlined in complete detail how a new paradigm of water management and governance needs to be adopted in India. The only question before the country is will the people of India be able to persuade and push governments to act on these path-breaking proposals for reform? Thank you very much.

Bharat Punjabi:

Thank you. Thank you, Professor Shah, for a very compelling talk, drawing from your experience as activist and researcher and Professor Gergan and Professor Nagendra for providing us a very good synoptic view of the challenge in cities in India and the challenge in marginal environments.

In fact, Professor Shah's talk actually brought all of these things together on the water issue, because here in Canada our Indigenous communities consider water as life and I'm sure that that's wisdom shared in India as well. There are there are so many questions in the chat, which I'm going to try to relay to our panelists. You can feel free to weigh in as well as you can. The chat box is visible to you as well.

I wanted to start with a question which was proposed to Professor Gergan on Indigenous communities in the Himalayas. The question is about, how given the kind of multinational nature of countries like India, and other countries which have Indigenous populations, what is really the potential here for involving Indigenous communities in confronting natural resource problems? This is a question speaking about ethnicity, diversity in other contexts, as well in India where divisions of cost, ethnicity, and class pose an obstacle to collective action in local situations. I opened this question to Professor Gergan, also Professor Nagendra and Professor Shah. What should we do given the challenges of diversity in India? Professor Gergan, you can go first.

Mabel Denzin Gergan:

Thank you so much for that question um. I think it's just…I read that first question and I think there was also this question of how are indigenous groups kind of managing in the face of these like big countries like India and China? I mean it's also a question of scale right, like it feels almost impossible for someone like a small antenna movement or even Indigenous groups collectively to push back against something that is happening at such a large scale.

I think what I'm…what I didn't get time to get into, especially for the lepcha community in Sikkim, is an example of Indigenous groups who have always had to negotiate their place within very large, kind of dominant like group. So, the lepcha community is this small tribal group along with the (indiscernible). They're considered to be Indigenous to Sikkim and the Sikkim kind of kingdom was run by the Tibetan monarchy, the Namgyal dynasty. Even at that time, even for the (indiscernible) who had to negotiate with the Dogra, the Dogra people and the British, these negotiations are not new for Indigenous communities.

Even though they might be a minority in terms of like good numbers, there's a lot of history here of how these small groups have had to constantly figure out how they're going to relate to big groups, these big countries like India and China. And in terms of trying to understand what a part… could you repeat how you framed the question?

Bharat Punjabi:

Given the sheer complexity of India, the ethnic diversity of India, the divisions of caste and class, and marginality you know with a number of cities actually sourcing water from tribal areas as well how do… not just you doctor Gergan, but this is a question to the other panelists, how do you ensure collective action in the interests of sustainability?

Mabel Denzin Gergan:

Yeah, so what I wanted to say about that is that in the Indian Himalayan region we have this form of like governance, which is under asymmetric federalism, that actually protects the (indiscernible) schedule and special constitutional protections for tribal governance. Sikkim is not under the (indiscernible) schedule, but it has article 371f that does protect their Indigenous governance and structures.

And what I would say is at this time, especially as we have witnessed in Kashmir, in Ladakh, as article 370 has revoked, it has also taken away a lot of the constitutional protections that protect a tribal land from being bought and sold outside of the community. This is a fear that you find across the northeast and Sikkim, where there are special protections for, constitutional protections for tribal land and access.

I would say, in the Indian context, it's very important to protect those to ensure that those protections remain, because there's a lot of pushbacks against, especially from mainland Indians, that these protections have spoiled this region, or that they restrict access and that they're unconstitutional in some way. But just given the kind of violent histories of how Indigenous groups have been incorporated into the Indian state, these protections have been very important for sustaining biodiversity and collective forms of living and being. So just in terms of state and, I would say it's important to protect this asymmetric federalism that is supported in the Himalayan states.

Bharat Punjabi:

Right, thank you. Thank you. That's a very important point.

Mihir Shah:

What if I can add? I can respond because I think your question is extremely important, because I am talking of participatory approaches. Collective action is at the heart of those. My simple response sometimes is to say that look when India became independent, you know what was said about India?

That these are people who cannot govern themselves because they are divided completely on lines of region, religion, caste, what have you. The fact is that the answer to the problems of democracy so to speak because that's what these are, is deeper democracy, not less democracy. What we find through the experience of collective action is that initially these problems are there, but the way these problems can be resolved is by empowering these bodies.

So, like Professor Gergan was saying about a different context, I'm talking about even the heartland of India. If we actually empower the water user associations, those doing the groundwater management, then what happens is they take decisions and they resolve their conflicts, because what happens in common pool resources is that they incentivize collective action.

As the work of Elinor Ostrom teaches us, we will not be able to manage these resources unless people come together, and even the rich and the powerful, or the upper caste in different cases, will suffer equally if they over exploit groundwater because that way nature is very even in the meeting out of justice, as we find in climate change itself.

You will find everyone is going to be adversely affected, of course there can be differential rates and degrees of the way they are affected, so I think the deeper you take these democratic forms of collective action, the more solutions you will find and the conflicts that you talk about get resolved in that process.

Bharat Punjabi:

Yes, thank you. That that's a very insightful and hopeful kind of scenario. Professor Nagendra, I mean given that you've also been part of activism in Bangalore, how would you respond to both Professor Gergan and Professor Shah on this question of governance where decentralization has taken a back seat in rural India, but also urban India. What are the prospects from where you are talking to us in Bangalore? What can Bangalore provide us with? A model maybe?

Harini Nagendra:

I would like to think so, but I think it's very challenging on the ground because cities might be the hardest place to get collective action to work for specific reasons. For instance, if you look at Bangalore and some of the things we have seen is there are, well, obviously much of the lake revival is driven by influential residents, right? So, they might be resident welfare associations, but they're usually economically wealthy, educated, and upper caste and so that's one part of it. One interesting thing you'll see that they're often women driven by women, which is a very interesting part of gender and collective action in cities that we see.

But that said, there are lakes, there are electrics and lake groups, and some have tried to be much more participatory. For instance, trying to work with the government to find ways to allow grazers in, or work with official groups to be collaborative, right? So, on that part, I think there is a lot of work to be done but there is at least hope of progress.

Where it gets very hard is with the migrants because in the Indian migrant situation, especially migrant labor is so temporary, you might have a set of plastic shacks near the lake where people come for three weeks or three months and then leave, or they go back on weekends, and they pay for it to stay in a tent every day.

In such situations, they are the ones often most affected by the lake, or most affected by commons, most dependent on them for water grazing, not grazing, using water and fuel. But these are the two big uses and sanitation, but they are the ones who are not around there. There's no way in which they can be involved, so I think this is really going to be one of our hardest challenges in terms of…India will be full of migrants, temporary migrants for a very long time, yes.

Bharat Punjabi:

Yes, and urban formality poses very unique challenges in cities like…Professor John Harris, who's actually helped us bring together this event as well, and the series as well, has raised his hand for some time now and I would like John to go in and ask his question. John, you can unmute yourself actually and ask your question.

John Harris:

Okay um, am I heard? Thanks so much. This is a question for Professor Shah. Thank you so much for a really, very compelling talk, but my question is, what are the prospects for India learning from experience over the next 25 years? I mean I'm just struck by the fact that some parts of what you're talking about have been written about, have been advocated for a long time…I mean I think about what you were saying about participatory water management.

I mean, these ideas were developed and put out by Robert Chambers, for example and others, going back almost 50 years, and there's very little sign of having been learning from the research and advocacy that was done 40 50 years ago. I mean, what are the prospects now for learning, given little learning over the last half century?

Mihir Shah:

So, John, you've really expressed the question that I am agonizing over ever since I've been trying to lead the water reform process in India. But I would slightly correct you on the fact that no learning has occurred. Actually, a lot of what I said in my presentation is based on fairly large-scale work, whether it's in participatory irrigation management, groundwater management, work done in catchment area protection, the watershed program, these are fairly significant initiatives that have taken place and many of the state governments have actually pioneered these initiatives.

It would not be correct entirely to say that nothing has been learned, but you're absolutely right that the scale at which this work should have happened, the investments that the government of India and the state governments need to put in, have still not come into play and I think the answer to your question is very simple. The crisis on the ground is getting serious, the more water can become a political issue if you like, an issue which would make or break governments.

That's when we will see action on the ground at the scale that the country needs to see. Without that, and so far, that has not transpired. We have been trying to actually advocate with political parties as well, that we must now give water the kind of priority it needs and there has been a lot of movement on the ground putting pressure, but I think that pressure is still not of that cutting-edge quality if unless the citizens rise and compel governments. That's why my last statement in my presentation was that when will that happen? When that happens, the answer to your question will emerge. Without that, I think we will continue to remain in the situation we are in today. Thank you very much.

Bharat Punjabi:

Thank you, John. Thank you, Professor Shah. Given that we just have 10 minutes, if the panelists don't mind, I'm going to bunch the questions together in the way that…A question for Professor Nagendra but could also be responded to by the other two panelists. How do you think…what kind of contributions could better north-south relations play in meeting the challenge of climate change, whether in cities, but also other environments? The other question is about education.

The role of education, which was a highlight of Professor Gergan's presentation, but also is valid to the kind of work Professor Shah is doing, questioning the kinds of expertise that are presented in some of the water governance bodies. What is the role of the youth and educational institutions? This question comes from an Anirudh Kishor, and the question on climate change is by Professor Yerushalmi. They're both in the chat box and you could take a look at them if you…I just tried to capture the essence of both these questions. Professor Shah, would you like to go at that first?

Mihir Shah:

Well, on education, it's I think very simple. In the new national water policy, actually, we have an entire section on education because water education is still mired in the colonial era, I mean, we are speaking of engineering, being taught of how to construct large dams. Actually, there may not be many sites left where you can locate these in the northeast of India, where we are trying to destroy whatever is remaining of the Himalayan ecosystem. I think what we are saying is a fundamental change in the way we do water education, and we want to start from the school curriculum because we all…I think you would have also learned the water cycle.

There's always the diagram in the schoolbooks. Of course, our water policy makers have forgotten the water cycle diagram, but much more about this new paradigm of water management and governance has to be included in the curricula of water education, and that's why in the Shiv Nadar University we started this pioneering water science and policy program, which is exactly trying to fill in that gap.

One program will not cut it, we need to do it across the board. That's when actually we'll get water professionals with this transdisciplinary understanding of water, otherwise we continue to be dominated by the engineers. I have nothing against engineers, I'm sure many people in this conversation are engineers, but we need the other recipients to work with the engineers to give a holistic perspective.

Bharat Punjabi:

Professor Gergan?

Mabel Denzin Gergan:

I think education… I think the question was… Am I talking about formal schooling? And yes, like in the case of the lepcha students, it is about formal education, it is about higher education (going to college), but I think what young people learn is not just from sitting in college or in the

classes, but through that movement between their home territories and the big cities. One of our interests in this project was to understand how young people understand their place in India, especially as they face racial discrimination and they're told that they don't look like they're from India, or they don't belong. How does that affect their understanding of the Indian state?

I think education here is like a much broader kind of understanding of not just formal schooling, but also what can people learn when they move from one context to another? Especially young people from the Somalia region that maybe don't know much about what's happening in Delhi or these big cities. Yes, expanding our understanding of education. The two examples that I gave come from art and activism that you spill beyond the formal kind of boundaries of education and in Sikkim. I think the context is there's high rates of unemployment among educated youth.

The young people that I spoke with were educated, unemployed youth and what I found was that there was a lot of government programming for unemployed youth, but a lot of it was directed by the central government, and I think if you're thinking about education, collective kind of action, these programs need to give over some of that power to young people in these areas so that they can design and lead their own and you know design and lead with how they are thinking about education, how they're thinking about activism, the environment.

So, turning over some of the power to young people and trusting them and their visions for the future is some work we've been doing with the Karnataka government, which is early stages, but there are village wooded groves, the woodlots called (indiscernible), which were very close to Bangalore and disappearing. We started by…we wrote a little, it's not really graphic novel, it's not really a book, but it's a little book with a story of a woman who comes back to visit her grove, and a conversation with a tree, and it's bilingual.

English one side, Canada on the other side, with sketches by our students. What was very interesting was the Karnataka state government then wanted 6500 print copies, which we've given them for primary schools across the state, and with this idea that this would also be worked into the (indiscernible) program so that the part of what the state does is to actually restore some of these wooded groves or many of these (indiscernible) across the state.

Now what we've given them is teaching booklets that a teacher can take, with primary school students out, and then they can do little things which are neither physics, nor math, nor biology, but just outdoor activities that integrate all of these, and get them back into the culture. So ask your grandparents what do they forage for? How do they cook it? It's early days, but I think if that goes into practice that really tells us how education can be instantiated at a very powerful level, at a very young age, and to me that speaks of the fact that one of the biggest challenges we have with urbanization is that children will become disconnected from nature.

They will have mental challenges because of nature deficit disorder, but also, how will they work on conservation or sustainability? They don't understand what it is to live with nature, so

we need things like this. The second quick example, because Mabel spoke about Sikkim, is work with the Azim Premji Foundation recently did with the Sikkim government to create a lovely set of primary school textbooks. I don't know if you've seen this.

With keeping the sustainable development goals in mind, which integrate local…for instance, all the names of the school children are local Sikkim's names. Whatever animals you have, would be local, domestic, or wild… so all of those things, trying to make a textbook which talks about sustainability development goals which translate into context that they can understand which, speaking of what Mahir was saying, is a very multi-disciplinary way because that's how children approach things naturally, right?

From these, I think we really need to do the technical training and I completely agree, but I think we also need to do something for very young children. How do we spread that gamut because these will be the future of the world or the decision makers and the leaders in the next 30 years.

Bharat Punjabi:

Thank you, Professor Nagendra. That echoes our own context in Canada where my students are very anxious about what climate change is going to do both to their future, but also to their present. On that note, I just wanted to quickly again thank all of you for taking out the time to give us your perspective on, and your vision for India's environment. I wish I could do more justice to some of the questions that have appeared but again, I wanted to thank also the audience for asking such interesting questions.

Our next event is going to be on Science in India on Wednesday, 6th July, at the same time, at 10 PM eastern. You can sign up for this event on the CIRCLE website. If you have joined us from our list server, we will send you an email inviting all of you to join our next session.

Again, I wanted to thank all the panelists joining us from various parts of India, North America and the world, and our audience for contributing to this event and to also giving us, as I said, some perspective on what India's environmental future is going to be like. Please stay in touch. I also wanted to thank (indiscernible) and our director for bringing all of this together. Thank you everyone, and I hope all of you have a good rest of the week and we'll see you very soon again. Thank you.

[End of transcript]