United Nations Sustainable Development Goals
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Lecture 3
Need for Change

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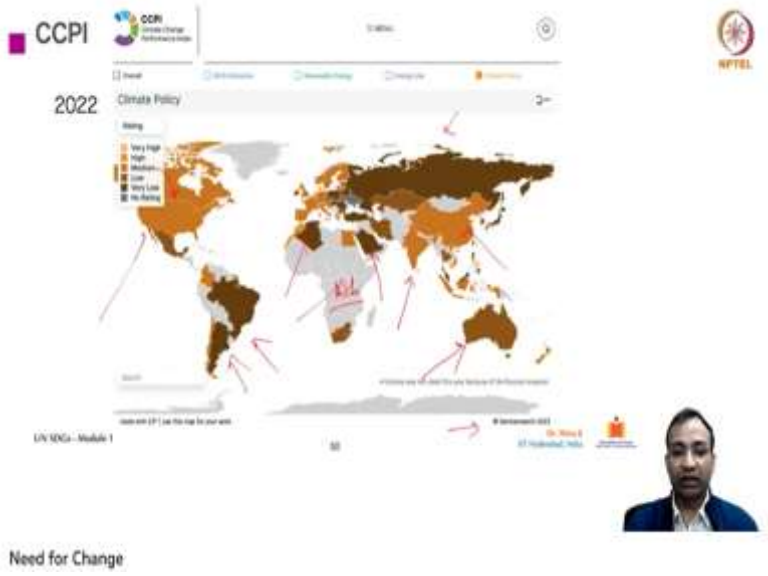

Particularly on the GHG emissions we can see this CCPI, how the countries are performing, very low, the major economies of the world, even New Zealand in this one, yeah, here, very high impacting ones, low, medium, so, India is on the better side. Some of these are under very high so, that means their performance is very high, that means they have very low emissions.

Next renewable energy. So, on that front you can see again, I am seeing repetition here, in many of these countries and a good performance by these countries. Further in energy use, so, performance index very low, here again the same thing is getting repeated and yeah, these are the good ones.

In climate policy, so, at least majority of those high impacting countries, they have good policies in place but that comes, it looks likes in the medium category, including India,

China, US, Canada. I see low climate policy performance index over here in this country, and very low in Brazil and these South American country and even in Russia, and some African country and some Gulf. Absence of data.

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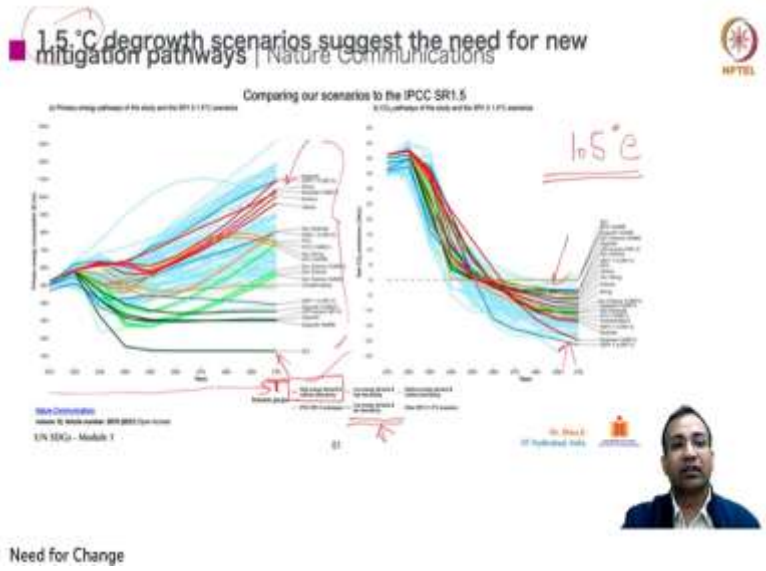

So, this actually date actually gets updated every year and you can have a look from this source for the latest data and even country wise data are also available. So, under this chapter, we discussed about the target of keeping that change under this limit. So, 1.5 degrees centigrade, degrowth scenario such as the need for new mitigation pathways. So, you can see these projected years are plotted over here and the projection shows, if we take the right actions, what would be the projection and if you are unable to take that, what is going to be the worst scenario that is also projected over here.

So, you can see high energy demand and medium decoupling, this red you can see most of these reds are here at the top. So, when there is very high energy demand, and medium decoupling and the better ones low energy demand and low decoupling, the dark green ones of course, those are there at the bottom. And these are actually scenarios which are going to be visible as outcome in these many years, and these productions you can see are drawn up to the year 2100 almost 80 years from now. So, these next 80 years are definitely crucial for the changes which climate crisis is imposing on our planet.

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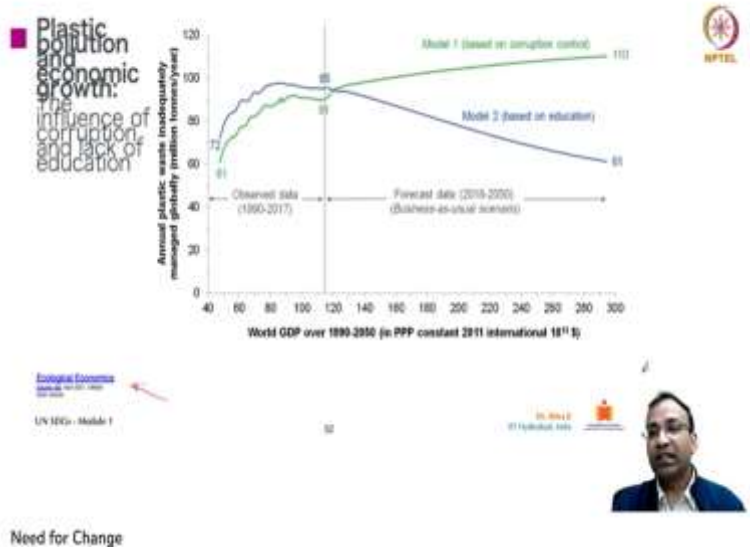

This slide, I thought is directly related because one of the major items which we usually spot at the points of pollutions, being the plastic. How is it directly related to the economic growth? So, this actually research draws, this comparison, this projection, like how the growth of GDP is happening and how the growth of this plastic pollution is also directly related.

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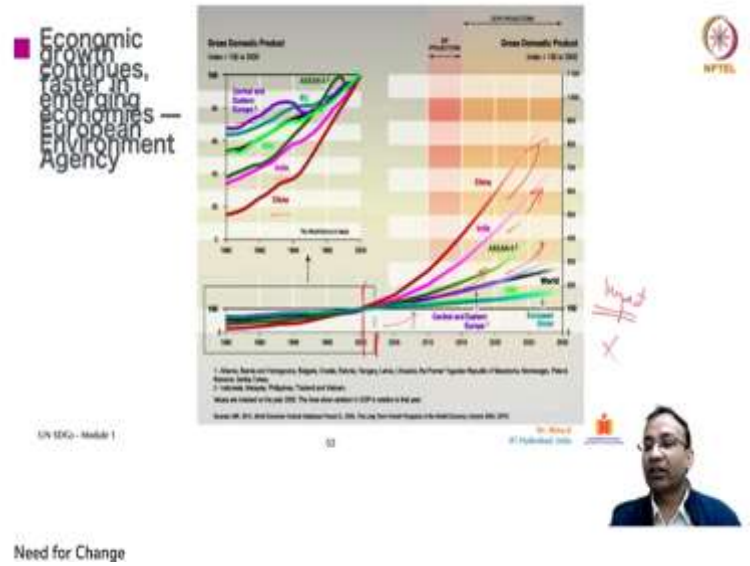

This slide also draws a projection, economy growth continues faster in emerging economies, European Environment Agency. So, this is a study from that EEA. So, you can see China, India, USA, EU and other Central and Eastern European countries and how they have kind of started rising after this juncture is kind of amazing sight to see. Well, it is not really

appreciable, because, well, GDP is rising is very good. But if overall impact is also rising, that is not good. So, the effort should be to minimize the impact.

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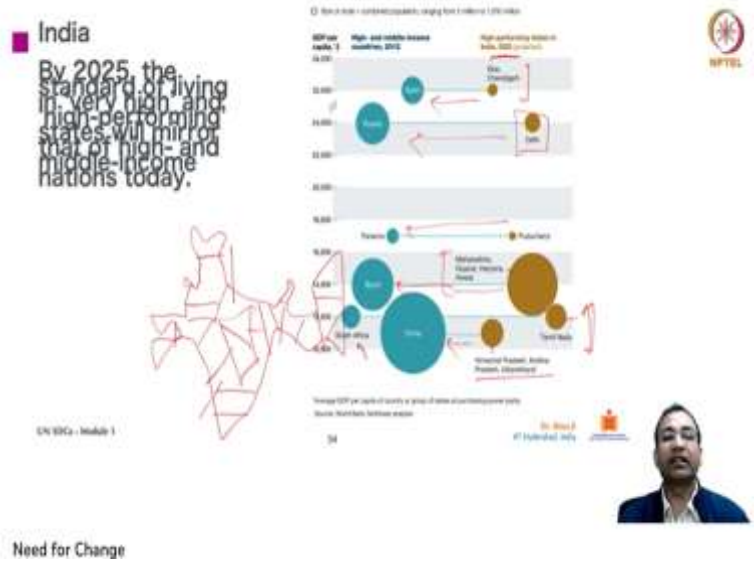

Here projection is drawn like how fast things are changing, here in our own home, India. So, this projection actually says by 2025, the standard of living in very high and high performing states will mirror that of high- and middle-income nations today. So, you can see it is projected that the GDP per capita of Goa and Chandigarh might reach in year 2025 as equal to the Spain. Of Delhi state it may equal to Russia and Pondicherry it may equal to Panama. Maharashtra, Gujrat, Haryana and Kerala these states might equal to Brazil. Here, Tamil Nadu might equal to South Africa. Himachal Pradesh, Andhra Pradesh, Uttarakhand might equal to China.

Well, this is you can see a state-based comparison, because in India also, India is a big country of diversity, like so many challenges and so many things are there. So, in these, all of these parts, if you see things are not changing at the same rate, at the same pace, perhaps right, how that also can take place is a challenge, right.

So, well, some are growing faster, some are not going so faster. So, how they all can be brought to the same level? Well, efforts must go towards those and the lagging behind states must be focused on priority. So, this projection actually talks a lot, it gives certain projection, like how things are changing very fast at certain places.

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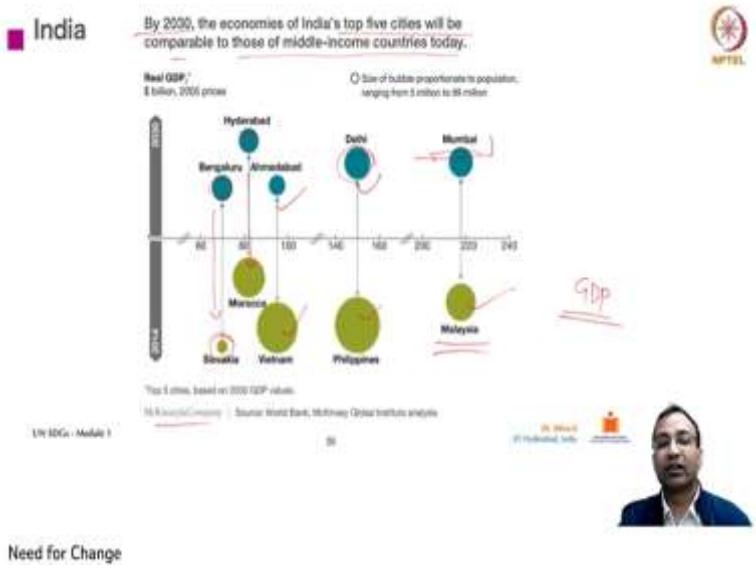

Another comparison like city wise, I found it very interesting study by McKinsey. This is a freely available for reference. You can check, So, by 2030 the economies of India's top 5 cities will be comparable to those of middle-income countries today. So, you can see, you will be astonished to see. Bangaluru is going to equal perhaps Slovakia as a whole country, the one city alone may equal by year 2030.

Hyderabad as one city might equal to this country in Morocco. So, the whole country's economy might be comparable to the one city from India, Hyderabad. Vietnam to Ahmedabad, Philippines to the city of Delhi and Malaysia, Malaysia is a big economy, the Mumbai city alone perhaps may sit as equal to this country. So, it is a comparison like how fast things are changing on the growth and development sector and the industry GDP. And all of those are the parameters, and how much potential it carries.

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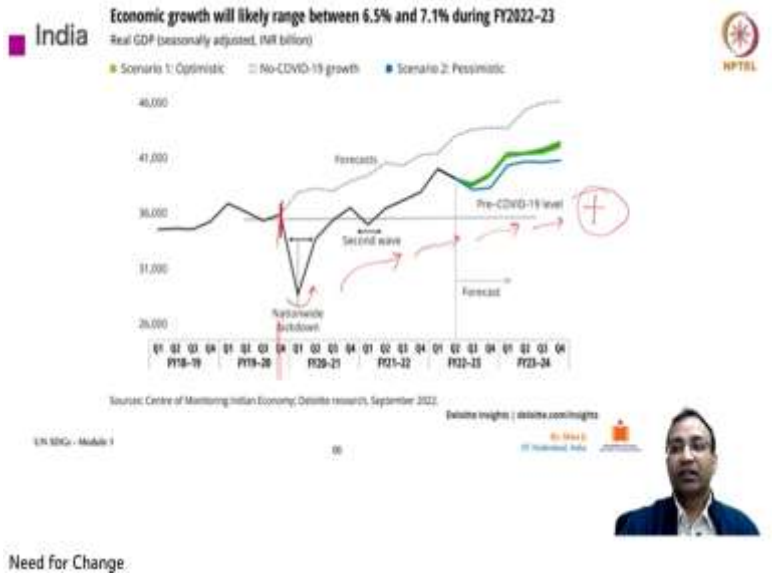

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Another projection which is given over here. Economic growth. Well, off course, pre-COVID, the economic growth was going consistent, but you can see this sharp turn over here, which happened during March 2020 because of COVID-19 pandemic, and not just India, the whole world's economy actually suddenly saw a major dip. But the good thing after a brief lull, there was a recovery and that recovery is slightly going up. So, we see there is a positivity, there is a hope, there is optimistic projection. So, you can see things are after post-COVID level things are improving.

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Another similar kind of projection, high frequency data for the economy shows strong and broad-based underlying momentum. So, you can see in the GST revenues, these green one E-

way bill generation, this blue one and this is that dip of COVID. There was another dip observed in the second wave and God forbid there should not be the third one and, yes, things are looking optimistic.

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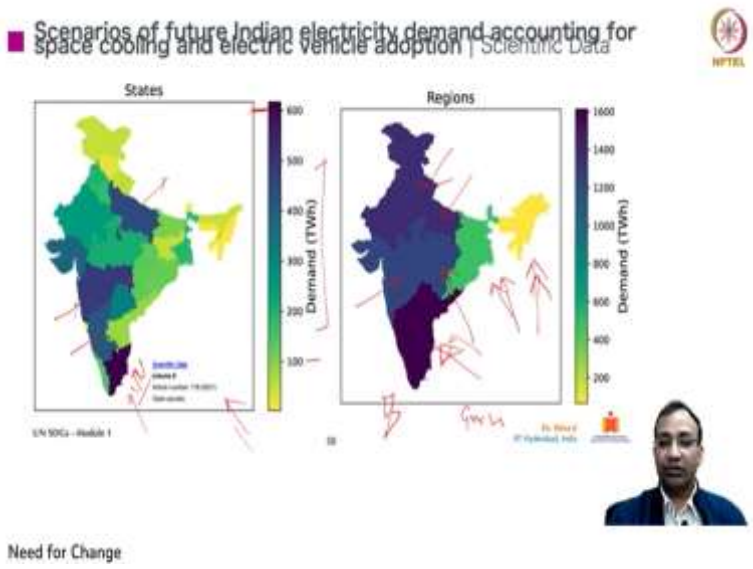

Directly to that related, we saw previously the demand of electricity. So, scenario of future Indian electricity demand accounting for space, cooling and electric vehicle and adoption. So, from refereed from this open access source, so, this is how the demand is going to be like, you can see this is a spectrum given over here, demand.

In TWh, 100, 200, 300, 400, 500, and 600. So, the dark ones, of course, we see the Tamil Nadu, Maharashtra, Uttar Pradesh, Karnataka, are among the top ones. And, region wise if you see of course, the Southern region are tops, then comes the Northern, then the Western Central and then we have these Eastern portion and then we have this Northeastern region.

So, you can see like how cities, how states are also developing. So, electricity consumption is directly proportional to the growth and development. So, you can see where interventions are needed the most. And accordingly, policies and frameworks can be introduced.

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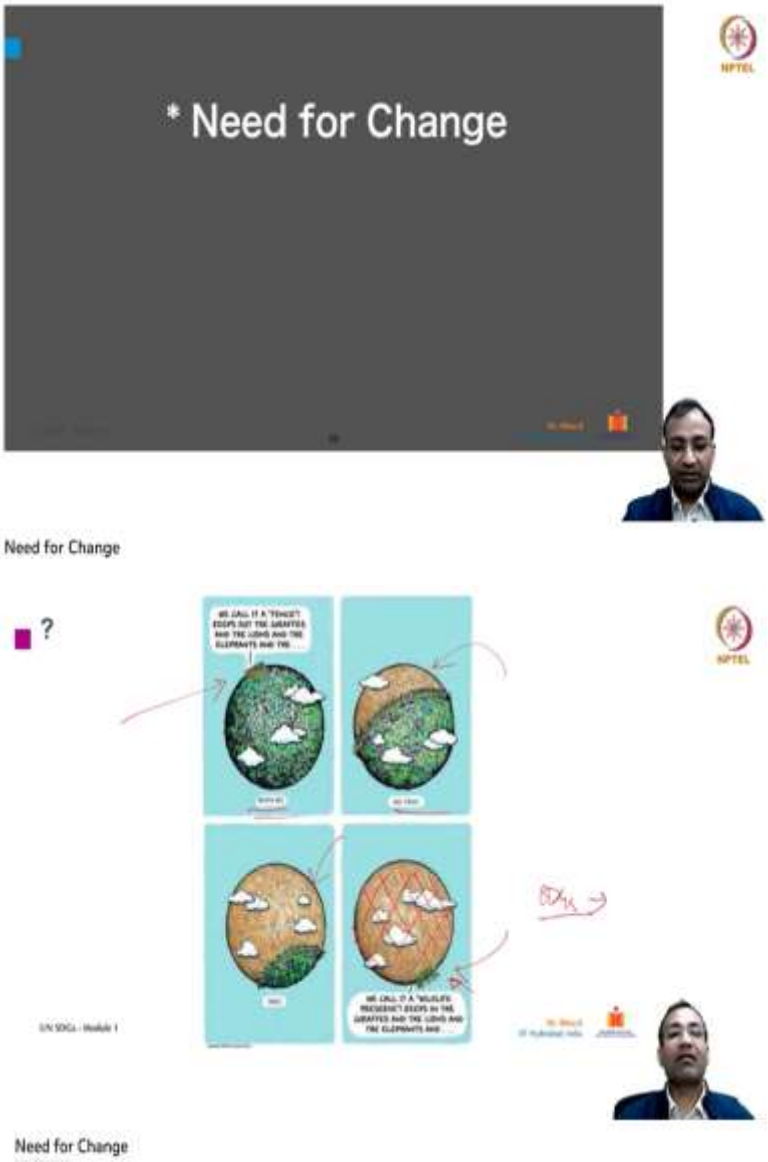

Finally, we are coming to the last chapter, Need for Change, under this module 1. Well, it is needless to say, why we need a big change in the current format of industrialization. And how this has been, well, in the last few years and few decades there is of course some improvement compared to the previous decades and perhaps the first quarter and the first half of the 50 years before or 70 years before or post heavy industrialization period.

So, this illustration actually sums up beautifully, this concept like how human society has over powered this whole planet. So, beautifully drawn, this was the human impact earlier, 8000 BC for reference you can see over here, and how it started changing lately. So, this is the human impact, with more human impact. And suddenly, this whole thing is overpowered by the human society, human race and rest of all other species. Unfortunately, they cannot

speak for themselves are now feeling the burnt, they are the ones who are taking the brunt. How this can be reversed is the task for these SDGs. I hope you will all agree.

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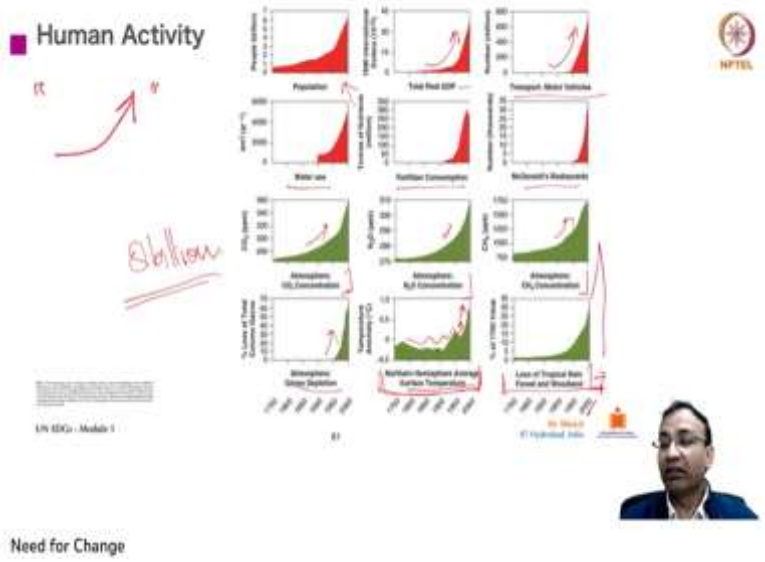

Coming to the more quantitative representation of this human impact, this human activity, you can see each and every this graph represents the human impact which has risen significantly in the last few decades and last one century. Population tremendously increased. Just few days back, we observed the day on which the human population crossed 1 billion mark.

Total real GDP you see most of these graphs are rising exponential. So, this is not rising in an harmonic progression rather if you notice, these are most of these are in exponential progression, which results into the exponential impact as well, and that is what putting us into the catastrophic situation, transport, number of motor vehicles.

Water consumption wise, fertilizer consumption wise, McDonald restaurants, even how they have been increased in number and then the impact wise CO2 concentration in the atmosphere you see, this has also risen tremendously, exponentially. N2O concentration, CH4 concentration, ozone depletion has risen significantly, Northern hemisphere Everest surface temperature, that GW, global warming like we speak off, the direct observation are the surface temperature, you see that is also zigzag and then is rising significantly over here and loss of tropical rainforest and woodlands by year 2000 itself we have again 22 years down the line. So, if you plot it again with the real one, real data, perhaps it maybe even steeper, even sharper curve over here. So, this has also risen significantly.

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Just illustration is enough to explain the pain. So, the question is can this be allowed further in future? Another one, the question is, can this be allowed to happen in the same way?

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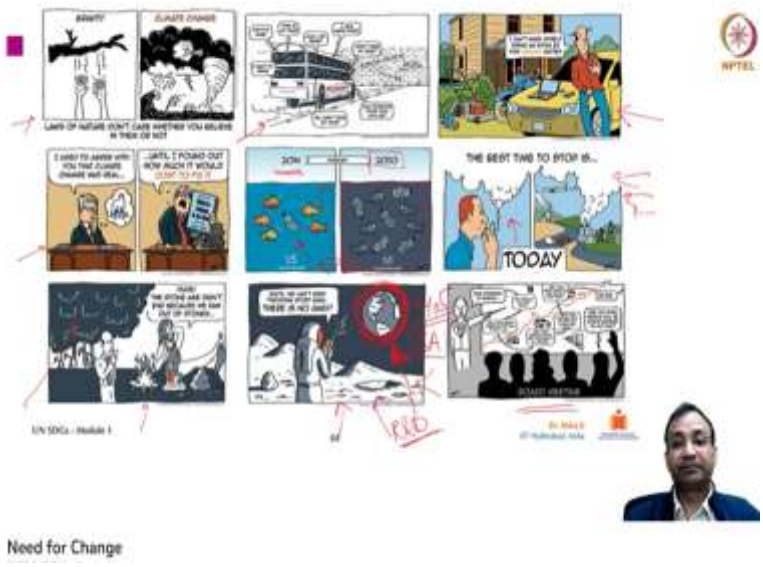

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Many more illustrations from different scenarios, I am sure you can relate at least one of these or probably many more. So, the first one, if you are from the coastal zones or if you are from the zones which are experiencing draughts, frequent draughts, frequent cyclones, frequent too much of rain, too much of water sometimes, resources too much, consumption how to fix it, the impact, how our pristine nature like used to be earlier and how it is now and how it is projected.

So, the year 2014 you can see, there was one plastic item in the oceans per 5 aquatic animals, aquatic beings, that is projected by 2050 in another around 28 to 30 years, this is going to equal, 1:1 ratio, just imagine how bad that day would be. At individual level, or even at systemic level, even at social level, community level, economic level, how things are changing very fast, how things are changing very fast. And definitely things are changing very fast.

Earlier the human presence used to be limited only till this planet. Now, we already know, if every human person on this planet adopts the lifestyle of a common citizen of United States of America, we need 4.5 earths, of course, now the world is not enough and we are moving on. Well, today, just for the sake of R&D, but who knows tomorrow for permanent settlements by killing our own nice beautiful own home, now we are looking for another places. Our contributions, so think about it.

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I have curated some pictures which will explain themselves. I remember in my childhood seeing Milky way, our own galaxy beautifully, clearly in my village in the night sky. Now hardly there are there, four stars visible. So, much of change in a very short span of time. I am not that old. The rate at which this change is coming is really catastrophic. So, this beautiful blue pearl, this planet, I do not know what they might come upon us.

This is a shot of glaciers. This is a satellite picture taken from above. So, these are the peaks. These are the peaks. This is the peak, peak and then from here, this is the peak. These glaciers are actually flowing down, down. These are the fingers, you can see, these are the fingers, glacial fingers. Again, glacial finger, lot of fingers and then these are going down and from here this is that borderline.

This line is actually receding upward. So earlier, perhaps this whole zone, in the previous decades, or perhaps in the last century, probably this was also frozen white, the way this glacier is, but perhaps not anymore. And even it is not stopping here. This line is receding above and above and above. What if it reaches this pinnacle, this peak, that day there will not be any white element in this picture. We are talking about melting icecaps.

Emissions, is not an uncommon sight these days in the urban areas or on the fringes of the urban areas. How much of emissions, how much of giga tons of such emissions are getting generated every day. Forest fires, well, forest fire as a phenomena is not new, but the frequency of it is rising. The extent to which it is spreading is rising. That is where the concern comes. More and more places are getting engulfed. More and more industrial emissions.

In this picture you will see how important it is to hold the topsoil. And once the top soil is drained by erosion whatever may be the cause, that is going to have a catastrophic effect, because it is the first few feet of the topsoil which has the organic matter, humus and has those essential; nutrients in it to support this green entities and agriculture and other things. Once that is drained, it poses lot of questions, lot of issues.

These sights are getting normal these days, so many frequent such sights of disasters, falling on the human society. Some of the new places on the planet, which are getting inundated in water, which has not happened previously, in the last several lakhs of years, those kind of things are happening.

Very famous picture you may have come across already. The loss of habitat for several species, well, they cannot come and complain. Yes, this was a one that receding glaciers like that level I was talking about, how earlier it used to be and now you see the extent of it is receding and receding. Round the year presence of water is happening at several places. Earlier it used to get solidified in ice, because of the low temperatures.

Since, a majority of our population depends on agriculture directly for their survival and livelihood, there is a big question on this present format of development can we afford to continue that? Such sites, if you visit the nearby pond, lakes, rivers any other water body, forget about drinking water from them, you may not even want to step inside them. Horrific sites. No need, if you see in a practical sense, there is no need of any numerical collection and of course we need for a scientific experiments and knowing the extent of it, but without even going into that as a layman's observation that you can see around your place and can conclude why there is a need for change.

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Doctors put a price tag on the annual health impacts of climate change, and it is around 820 billion US Dollars and that is an underestimate. How much of effort and resources are needed to counter the health risks which may rise out of climate change.

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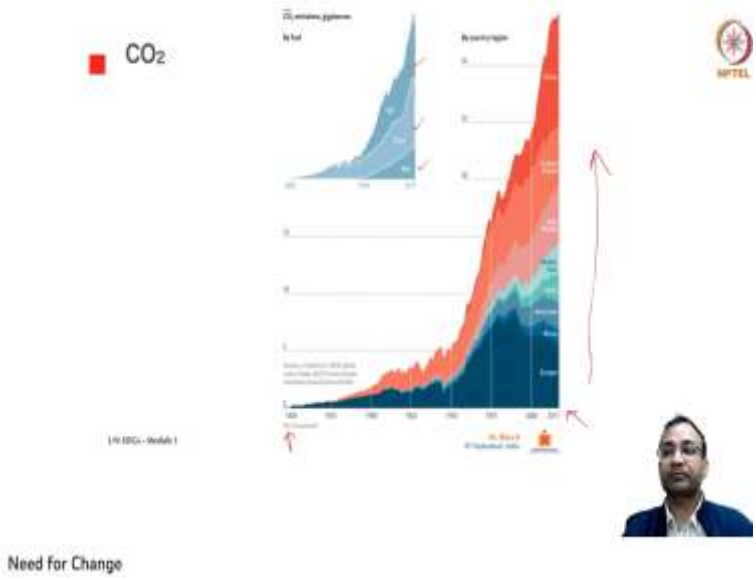

Further, few more numbers from the year 1850 till 2017, you can see how the CO2 emissions have risen, component wise, country wise.

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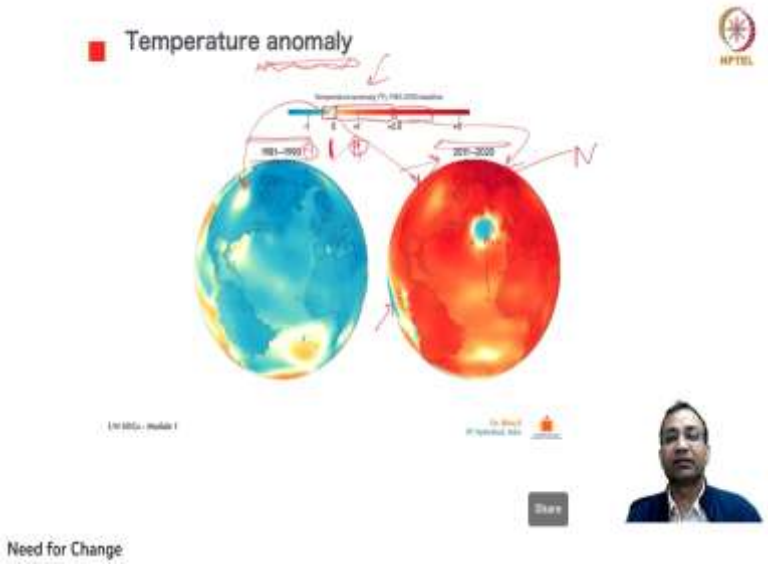

Temperature anomaly, this decadal actually pattern if you see 1981 to 1990 the temperature anomaly you can see the scale given over here. This is the level 0, plus 1, minus 1 side so the anomaly observed was majority of places during under this range, in this globe if you see. But in this globe if you see from during this decade, it is definitely going beyond like this at many places.

And at the ice caps if you see at the north pole, it is used perhaps this change at this rate, except just few blue spots I see at this phase of the globe. So, if you see the temperature anomaly is increasing.

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Damages, well, if we see climate change induced damages, they are immense, gigantic, we may not be able to even asses in exact quantity, right? So, it is just an illustrative figure, it has no data, just an illustration. The impact almost every country, every human being was impacted in some way due to COVID-19. Recession or recessions, they have the potential, they have already caused lot of damages in the past. Perhaps we are passing through a recession, even at this time. So, even greater than that, much more in extent may happen in climate change, and if there is a loss of biodiversity, then there is a collapse. Do not know how humans are going to get their food.

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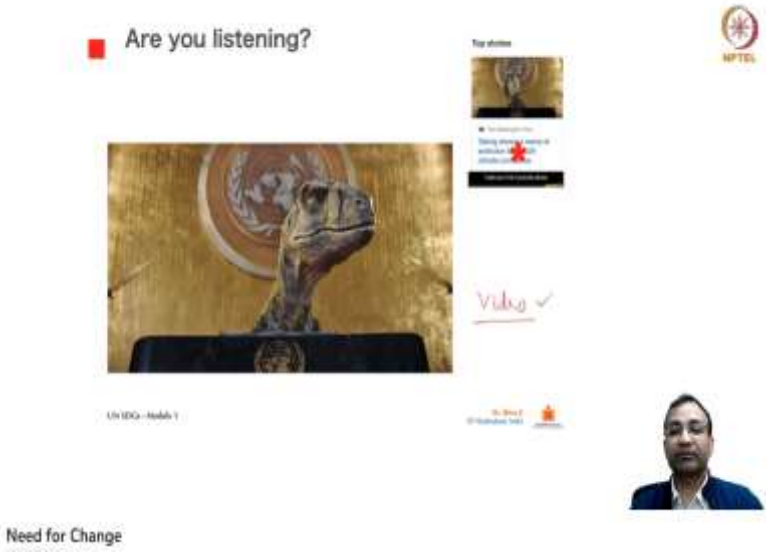

So, the point is, are we listening? If you search on YouTube, you will see this video, I would suggest all of you to watch it.

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So, the main environmental issues, now I am coming down to some finer points are about global warming. Global warming describes the process by which greenhouse gases accumulate in the atmosphere, in normally high amounts, trapping the earth's radiation and causing its temperature to rise significantly. This is linked to environmental problems such as changes in rainfall patterns, rising sea levels and expansion of deserts.

Pollution. Pollution of air, water and land or even more entities resulting from burning of fossil fuels. industrial processes, agriculture and any other human activity is endangering human health and the health of the other species also, biodiversity and the brittle movement.

Ozone depletion, ozone shiels the earth form ultra violet radiation and its depletion is caused by emission of Chloro-Fluro carbons, CFCs generally we know them, and other ozone depleting substances into the atmosphere. Increases in UV radiation are thought to be linked to arise in skin cancers, damages to the human immune system and altered crop yields.

On water, a third of world's population is still without access to safe water. And as the global population grows, the need for water will grow, as will waste and pollution which will increasingly threaten the quality of groundwater and rivers. Already, we are aware of many of the cities in our country, the water levels have gone significantly down and in some places now it is illegal to put your own bore, bore well in the ground. You can only get water through municipal supplies.

Resources, some non-renewable resources including natural gas and petroleum resources will eventually be depleted, the economically viable refraction of some abundant mineral ores may also be limited. Renewable resources such as timber are also at risk of over exploitation.

Deforestation. Deforestation through commercial logging, conversion of forest land to agricultural use. Another activities causes the destruction of natural habitats, and extinction of plant and animal species and exacerbates the effects of global warming and pollution.

Soil degradation, urbanization, construction, mining, war, agriculture and deforestation can cause soil degradation. Soil erosion increase salination, altered soil structure, drainage capacity and fertilization can diminish crop yields, increase the risk of flooding and destroy natural habitats.

Waste. Increasing amounts of waste add pressure to more landfill sites which pollute air, soil and groundwater and for more incineration, which pollutes the air and produces generally toxic residue.

Extinction of flora and fauna. The current mass extinction rates of plant and animal species are the culmination of the environmental damages to our planet. Population. Global population growth is associated with increases in the human induced environmental impacts mentioned above.

So, these are the main environmental issues, well, there may be even more of different extent, different scales, but these are the major ones. And there are a lot many like associated ones which come inside them. And those are inter related to some other activities, this activity, that activity again, you can draw a mind map, and track down the agents which are causing such things, and go and work towards improving them. With that, I come to the end of module 1. Thank you all for joining.