Strategies for Sustainable Design
Professor. Shiva Ji
Indian Institute of Technology Hyderabad
Lecture 3
Various Perspectives around Sustainability

Hello everyone, we will discuss about various perspectives around sustainability in this lecture.

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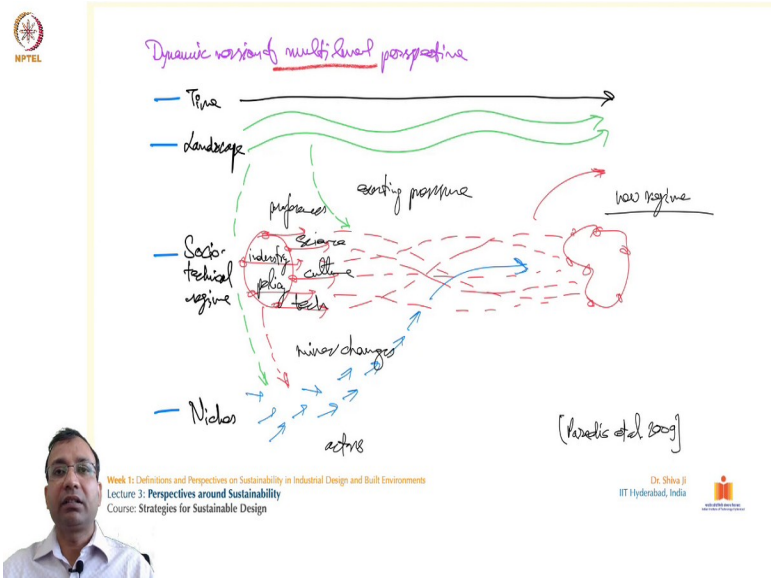

So, I have taken this actually a graph, it talks about sustainability at multilevel perspective. So, it has taken actually as you can see on the left side four aspects on which it is trying to draw an illustration like a how sustainability evolves overtime, how sustainability interacts with different like agent and these aspects which are on the left side.

There is an interaction also happening between them over the factor of life time. So, as I said earlier sustainability is a dynamic concept, sustainability actually interacts with the context on the side, of the side sustainability actually there are factors which interact that the other like factors and in turn their result with something, result in certain ways based on that results several new things actually born.

So, it a whole actually systematic actually an activity where there is actually a progression based on the interaction between the factor. So, if we see the whole ecosystem of like this planet, so we humans as a species have become an very important stake holder. So, here with the place at which we have taken our growth and development, other like a activities to satisfy our needs and

we have taken different ways of like creating our habitation over year resourcing our food from sourcing and meeting our different other types of needs over here. So, that has taken at all that we have already discussed.

So, we have become a very important stakeholders in the ecosystem. Apart from us, well, of course the natural balance of this planet is one of the things, but it has actually certain, we can call it is a universal principles of how elements are going to be have in the given circumstances.

So, example how water is going to be have, on a given temperature water will be have in certain way. On the other given temperature water we will be having in some other ways and kind of resources whatever we are sourcing they are all lying around in this nature. Whether it is like a manmade objects like plastics, whether it is like steel, whether it is like a glass. So, most of these elements are existing in the natural environment in this nature.

But most of how like creations which are like a polymers and several other composite materials and things, they are very useful, their application is very specific, they give us desired abilities through which we can perform certain functions, we utilize them into our daily life. Like for example, there are several other like a for example electronics, so electronics actually consumes lot of metals, precious metals, rare earth metals, several types of actually metals.

So, some of them are not so bad for the environment but some of them are really bad for the normal life like us and other living beings. We actually extract those animals from the nature. So, wherever they are currently, they are lying in a kind of a unreactive state, mostly, not all but most of them are lying in an unreactive, unharming state.

We collect them, we create a concentrated form of them, we change their chemical composition, we bring them into a certain form of compound and that compound carries certain characteristics which are not so good for the environment and that is where the whole problem starts. So, even if we are able to meet our certain needs by using them, but they are not so good for the environment.

So, as we can see over here on these four aspects of time, landscape, socio-technical regime and nature. So, how this sustainability actually moves, sustainability actually flows around actually this thing. Well, time is a universal factor, so time is always moving ahead, time has like certain

effects and things change over time. So, that is a generic principle, even this nature, it has not been into this exact form like forever. This has been transforming itself into this for a very long time.

There is that time spam of this balance being there that is in lakhs of years and millions of years. So, there is been cycles of such like a phenomena on the planet earth and this current phase is also part of that cycle and we are currently at this present stage. So, the question arises, if there is any disturbance then what will happen?

But anyway, so on the landscape if you see, the landscape on this aspect, things move in forward direction. So, landscape development exert pressure on the region which thereby opens up in different dimensions and creates opportunities for new technologies and practices. So, with the landscape here we mean the context of the applications and uses of like things and a goods and materials and techniques.

So, for them actually we developed certain technologies. For example, I just spoke we extract certain minerals and certain metals to utilize them for certain purposes. So, that is a very specific need and for which we create certain technologies and practices to use them. So, this is also gives kind of a boost to how the sustainability is going to be like.

So, it always carries an influencing role and from here only as you can see this green dotted line, so this is the connecting to this niches aspect, so this talks about external impacts on niches. So, via expectations and networks. So, what is happening? In the context we have discussed earlier there is always like two types like local and external. So, local and external, so local is very, very rooted to that place.

So for example, vernacular architecture, so the vernacular architecture is a form of architecture which is rooted to a place. So, it has evolved at that place which is rooted at that place it uses the climatology, it uses the resources like for example the types of trees available, the types of (()) (7:26) and grass available over there.

For example, we see tash houses and mud houses. So, they do not bring their resources, the construction material from elsewhere, they gather up resources from the place itself and just build the house. So, that is one very strong with major characteristics of vernacular architecture.

If you go to Rajasthan you will see architecture in stone. If you go to Assam you will see lot of use of mud and bamboo and tash.

If you go to southern states like Kerala you will see a lot of tinder based thing and lot of (()) (8:01) because that place actually experiences a lot of rain. So, these things are very, very local, but if you see the external part of this context, so like human behavior, human practices, the cultural values they spread on a larger foot print, so they overlap in between like different states of like today's (())(8:25).

So, how these things also have some effect, how the architecture in the southern India as a whole has evolved over time? So, there are major such things, they also influence it on the sustainability parameters. On the third if you here you see, there are several small, small terms given over here.

For example, industry, science, culture, market and user preferences, policy and technology. Well, all of these have certain bearing on the evolution of material culture and product culture, on any given place, on the overall sustainability, because the product culture itself is responsible for the sustainability, it is directly related with the sustainability, how it is going to be.

So, there in this region if you see, there is an interplay, there is an interplay, they are actually moving between one to another, they are shaping each other, they are influencing each other and they are turning into a new geometry altogether. So, the geometry which started from here and geometry which turned out here is different.

So, that is actually the game of time on which how things evolve, how things shape each other, how things get shaped by the other stakeholders, by the other agents, by the other factors. So, this is how we are landing towards new regime which influences the landscape. So, with the combination of like such if there is change observed in any of these.

So, there will be a major change possible on the overall resultant, but that also depends. There may be a big change against a small change or there may be a small change against a big change, there may be a no change, there may be a certain different kind of change, there may be something new happening altogether. So, this is like a unpredictable, this is unpredictable on how things go.

But yes, in today's time of research and development, the scientist and sustainability signs we are studying this phenomena, how things actually evolve over time and what are the changes if we exert in one domain, so how it is going to result the other domains and that is the scientific study around like sustainability.

And it is being predicted like all of these carbon emissions and things which we are discussing they are interrelated here. So, if we keep exerting like a footprint so how it is going to be evolve, how the whole scenario of this planet is going to be. So, those are the actual things which are being tried from this diagram to explain.

Let us go to this the last one, the niches, this talks about like a minor networks of actors, support innovation on the basis of expectations and visions, learning processes take place at different dimensions. The next one elements are connected and stabilized in a dominant design, the internal momentum increases.

The last one, the new configuration breaks through using windows of opportunity, this is coupled with broader adjustments in the socio technical regime. So, in this one if you see there is lot of small multidirectional factors which are like moving forward. So, these are small networks of actors who actually affect the overall system.

So, as we have seen in the system mapping and like a system design exercise. These small actors and agents they also play to shape the final actually outcome of any system. So, this is very important to understand actually these also, like what kind of influences it will be. So, this is finally helping to shape the final regime, like how is going to be. Let us move on and in this slide there are some actually observations I would like to bring to your notice.

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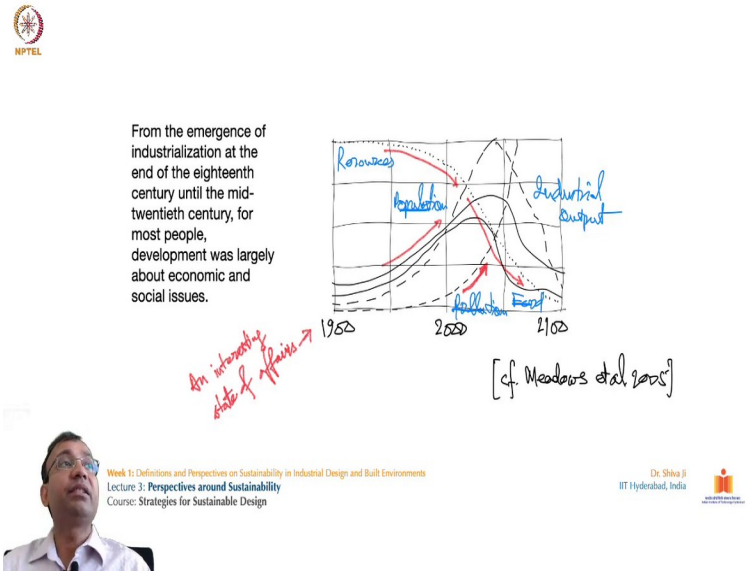

So, there are two graphs on this slide. So, the first one talks about the state of the world. So, let us just see the first one state of the world. In the state of the world it is being observed, the resourcing they are falling down, just see this graph, this actually line. So, the resource are falling down, because resources, the amount of resources is finite.

And there have been a tremendous rate at which these resources have been consumed in the last several decades and last two centuries. So, this is going down. The next one, the line of this population is of course increasing, this is the base year like 2000, 1900 and this is a projected year 2100. So, this population is of course rising, it's rising, rising with the help of persistent efforts from different government and agencies and health sector it is being projected that population may start coming down in the next 50 years.

So, we are already year at 2020 and then is going to increase even further around the year of 2035 to 40, it is being projected that it may start actually going down gradually. But it is still unknown, it is just a projection. So, how successful these efforts will be that we are yet to see. But anyway, it is being projected that is going to come down which is a good sign.

But, on the contrary pollution if you see it is increasing exponentially and is going high and high and high. In the last lecture be discussed how the several big economies and countries they have

pulled out of the like platforms where other governments take this commitment to reduce the overall like a ecological footprints, so they are pulling out.

That means they not ready to co-operate to save on these factors. So, in turn it is very, very direct and very, very evident that pollution is going to like increase like ever. Exponentially which may actually create a catastrophic situation. So, resources and food is coming down, pollution is going up, population is it is predicted that it may come down and industrial output is also projected that it is rising, rising and it may come down. Well, again is projection we will see.

Let us go to the next table. So, here in this one and we are talking about human welfare and footprint. So, in this one, we are seeing this human welfare index is rising, this is base year 2020, it may also come down which is not a good state of affair. Because if that human welfare is going to come down that means there will be miserable conditions for the humanity to see.

There may be short supply of food, there may be short supply of resources, there may be short supply of other recreational thing, there may be short supply of like other critical resources like education or habitation, housing and other stuff. So, this is not a good state of affair. So, this is being actually, if we combine these two graphs, so we can conclude that with this actually the rate of, the growth of population with the decline in the resources, with the increasing like pollution, the human welfare index is projected to suffer, to take at all in the next 50 years or so.

So, this may create imbalance, this may create other bad situations like Civil War like a hunger beast, talls may increase, there may be a displacement and migration happening in different parts of the different countries, people may be forced to move out of their places because of the climatic situations, because of the bad economics of that place, industries may go down, the overall livelihood may start suffering.

So, these kind of catastrophic events are actually kind of a being like a projected, if it does not, on these sides if we still continue to consume the resources at the same rate and if the pollution is going to keep rising on the same rate, so these are the kind of a projected events which the world may have to see tomorrow. Yes, move on, so why is sustainability is so important that we should be bothered about it?

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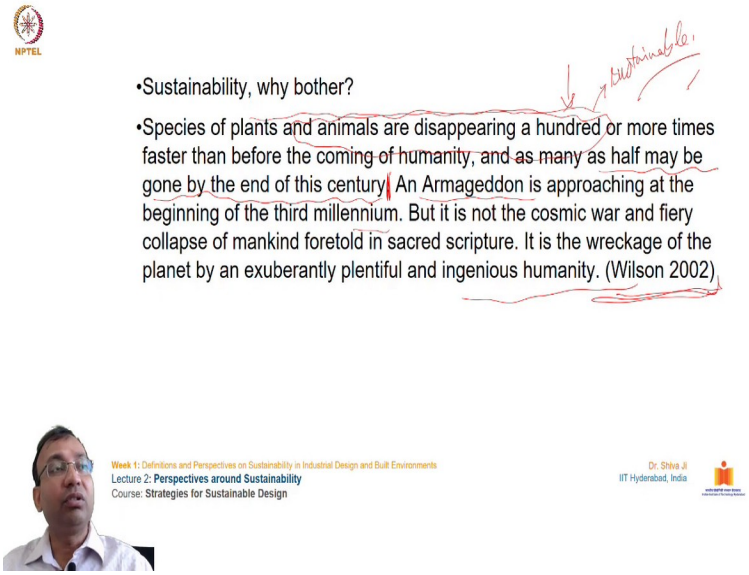

So, if you see this slide, it is not just the humans who are the habitats of this planet, is the different plants, the different animals, different birds, all of them they are the equal stakeholders of this planet, they all deserve, they all need this planet for their survival. So, why this situation is come over here that some of these plants and animals they are disappearing as a species they are vanishing from this planet. Because this planet is not any longer able to provide sustainable life conditions for their existence. So, this becomes very questionable, like what is the cause of it?

Well, as we can see post industrialization in society has caused a lot of tremendous harm to the planet. So, there is a direct connection between the development and the loss of the other different species on this planet. So, it says as many as half may be gone by the end of this century.

This is really disastrous, like there are some species which are at this breaking of like completely vanishing from this planet as large as half of like this thing by the end of this century, 2000 like when was the year like 2100 when we reach, so that year we may be witnessing a huge number of species vanishing from this planet, so this is a very bad situation, how we are going to deal with this situation.

So, it says an Armageddon is approaching at the beginning of the third millennium. But it is not the cosmic war and fiery collapse of mankind foretold in the sacred scriptures. It is the wreckage of the planet by an exuberantly plentiful and ingenious humanity. Well, this is said by Wilson in year 2002. So, this is all in the name of growth and development which is creating such an havoc to the planet.

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So, what are the different sustainability perspectives? So, there are five major ones, we will see one by one. The conventional economist perspective, like a we have to maintain the equilibrium, we have to maintain the balance and then the second one, non-environmental degradation perspective and the third one integration perspective that is encompassing the economic environmental and social aspects. The fourth one intergenerational perspective and the fifth one holistic perspective that combines integrational and intergenerational perspective.

So, here this talks about integrating the society, integrating the different species and talking about the intergenerational that means not just this generation in which we are living, for the future generations also.

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And for actually handling such situation United Nations has come up with 17 sustainable development goals. We know them generally as SDGS, UN-SDGS. So, these are the 17 SDGS actually are framed to cater to the different catastrophic situations which may occur for humans, for different species animals, for birds, for reptiles, for aquatic life, for vegetation, for the resources of this planet, for the natural elements of this planet, for each and everything from which actually this planet is composed of, this biosphere is composed of. These SDGS are trying to solve their problems through these 17 SDGS.

So, if these 17 SDGS are self-sufficient to address any sustainability relational issues right now across the countries. So, it starts from the first one which talks about no poverty. So, no poverty as we can see like bad economic situation of any individual or any household can cause at all on the future of the next generation.

Because if that family is not able to feed properly to their family members, this malnourishment is going to cause several disease situations for their newborns, for their elders, for their ladies in the house and the second one talks about zero hunger, even if humanity has developed so much in recent times, but there are still very sizable number of people across different countries who are still in a very difficult situation to feed for themselves, to fend for themselves, they are not able to meet two meals per day.

So, this number is still very huge, so it puts a big question on all of this growth and development efforts and the economic system. Like how well we are doing on these terms. So, this zero hunger comes right next to it and which is one of the very important ones. The third one is about good health and well-being. Of course, for maintaining a good life, a good psychophysical condition we must have a good health and well-being, not just physically even mentally. So, this has taken an attention in the recent times to maintain the balance of like a physical as well a metal capacity of any human being.

The fourth one quality education. Well, education has the potential, that is with the help of that one can change their future, they can change their livelihood, they can get a better opportunity for a professional life, for their occupational life, for funding for themselves, for earning livelihood.

So, education is an empowering agent in today's society and it is proven, but it is proven with the examples of like you and me in the society who have educated themselves and who are at least become as useable resource for this society and that is why this human resource must actually receive the quality education.

The fifth one is about the gender equality as a society, we must be sensitive towards all of the members of our society whether they are female members, whether they are the specially abled people. So, this gender equality and this thing is addressed by this one.

And sixth one talks about clean water and sanitation. Water is very important and there are n number of like diseases which born out of the bad conditions of the water. So, this should be addressed and there are several countries which we have seen in the previous lecture. So, they are not doing so good, on the well-being of humanity. So, in those countries specially these water based diseases and these situations are very common.

The seventh one, affordable and clean energy, so that well energy is the prime region for taking up any enterprise for doing any tasks these days, so energy has become very important but it should be clean. So, there is this focus of being it clean. So, it is shown through this graphic, like solar energy is considered to be one of the clean ones. So, we should focus towards that clean energy sources.

This eighth one talks about, decent work and economy growth, so that everyone gets a opportunity of working opportunity of a professional life, so that they can register a kind of economy growth for themselves and their families. The next one the ninth it says about industries innovation and infrastructure.

Well for growth and development infrastructure is very important, because with the help of this infrastructure we create like spaces for like habitation, spaces for like working, spaces for manufacturing, etc. So, this is important and the tenth one talks about reduced inequalities. Inequalities means everybody should be considered at par with each other, they should not be any in equilibrium in the society, nobody is bigger, nobody is smaller, everybody has the equal rights, everybody should have, should get the equal opportunities.

The eleventh one talks about sustainable cities and communities, so that all of these efforts are being done to create sustainable habitaneous system, sustainable societies, sustainable communities, where we can interact with each other, where we can live happily with each other, where we can support each other along with being in the sink with the nature. The twelfth one, responsible consumption and production. So, as we have seen, as the number of people are rising and as consumerism is rising, it is putting a lot of stress. So, we must put a check on this consumption based practices.

The thirteen one talks about climate action. Well there is a lot of big effects like GNG emissions, so greenhouse effect is happening, global warming is happening, these are the major scale events which are the resultant of the mindless growth and development post like industrialization. So, we should establish our practices to check the effects which are happening due to the change in climate patterns.

The fourteen one talks about life below the water. So, one must not ignore the aquatic life because these lives are also very important, equally important in the water. How they are supporting the life on the soil by being in the water is also proven by the scientific researches now.

So, on the land, in the water, in the air, so land, water and air, in all these three mediums, so at the confluence of these three, we have this biosphere where the life is possible. So, in the depths

of the water or maybe in the extreme of the space or even in the deeper in the core of the Earth there is no life possible. At least we do not know of it. So, the life which we know is existing in the confluence of these three, so we must protect actually these elements, so even in the water to keep alive these different aquatic forms which cannot actually come and claim their rights in front of us.

The fifteenth one talks about life on land. So of course life on land is also very important, we talked about in these two over here and the sixteenth one is a like a peace, justice, strong institutions. So, peace, justice and strong institutions are very important to have actually a social balance in the human society.

So, as a social life as a social animal, we are very much responsible to create such a situation, such practices which give rise and support to our peace, justice and such value system in our society, otherwise it may start, it may go back to the older times where there was in the absence of such value systems, there used to be lot of wars and different kind of negative events.

So, one must not, we learn from the history and work for improvement of such value system for the present and the future and the last one which talks about partnerships for the goal. So, one cannot achieve such goals independently, one is not able to, one is not strengthen and empowered to do such, to take up such herculean task at the global level and accomplish. So, we need everyone's corporation and friendship and this thing as a whole to combine and achieve these stages.

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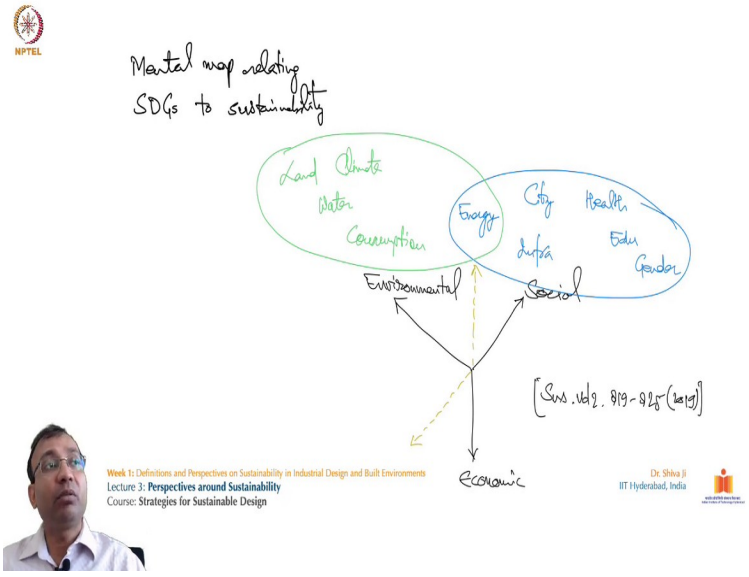

So, anybody see this dominant mental map of relating SDGs to sustainability elements. So, how is it happening? If you see this graph over here. So, this talks about three aspects like social, environmental and economic over here. So, on these if you see, SDGs are shown as points like water is one SDG element, this consumption is one SDG element, energy is one, land, climate, oceans, these cities, partnerships, hunger, health, poverty, education growth, equality, gender, peace, infrastructure, all of these are union SDGs points which we just saw in the previous slide.

And their sustainability elements are shown as the arrows over here, you will see here, this arrow, this arrow, this arrow, this arrow. So, they are, if you see some of these SDGs are overlapping between sustainability elements, sustainability aspects. For example, energy is common between here, between these two.

So, this gives us a mental map of relating SDGs which one falls there. So, from here we can device our action points to move forward with our objects which we derive from previous slide. So, with these seventeen SDGs, we must work out on action points and start working in these three aspects of sustainability, so that we can deal with the given situation in an respectable way. So, that is the whole idea of these studies of sustainability finds these days.

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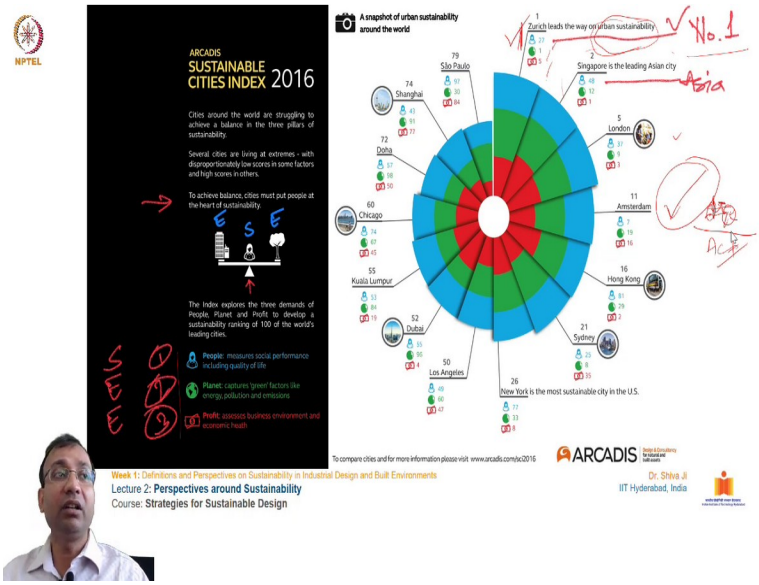

So, let me show some noble efforts which are being taken up across the world and how much they are faring. So, this slide talks about, if you see this city Zurich, so this city of Zurich has taken position of one and it leads the way on urban sustainability. So, in terms of urban sustainability, Zurich has become a role model in today's context.

Bifurcation of these (())(32:49) aspects you can see, like the people, planet and profit. So, on the people front, it has received 27, on the planet front it has received 1, on the profit front it has received 5. So, as a combination of these, it is kept at number one position. The second one

comes Singapore. So, in Asian cities, in the Asian continent, Singapore is leading the place of such responsible development which is the sustainable development model.

The next ones are, there are several cities like London, Amsterdam, Hong Kong, Sydney, New York and several other. So, you can visit to get the details like what are the efforts being made in different cities in the different countries, in what ways they are dealing with sustainable development, how they are handling in and it is very interesting to draw insides the kind of effort.

You may be all aware of city like Amsterdam, how they support the activity of cycling. So, the Prime Minister of that country himself use to cycle to his office. How amazing is that? We do not generally see such persistent efforts on a daily basis coming from different world leaders. Because for as a token gestures they may cycle or they may take a metro like one or two days. But they do not do it regularly.

Well, it has several reasons for them to not to go for like such thing. But yes, a consistent and regular practice can bring a change which could be taken as a green effort in this. So, Amsterdam is very friendly for the cyclists and the local traffic laws and regulations they give preference to the pedestrians and cyclists.

So, this is also protected by the act of law. Like the cyclists will be given a dedicated track. The safety and security of them while riding and while parking their cycles at different places, stations, buildings. So, such infrastructure, such supportive infrastructure actually designed and provided to them.

So, it is a holistic approach which supports this Nobel cause and it is not possible without that. So, that holistic approach is very important. So, yes, maybe you can read further about different sustainable efforts being made across the world.

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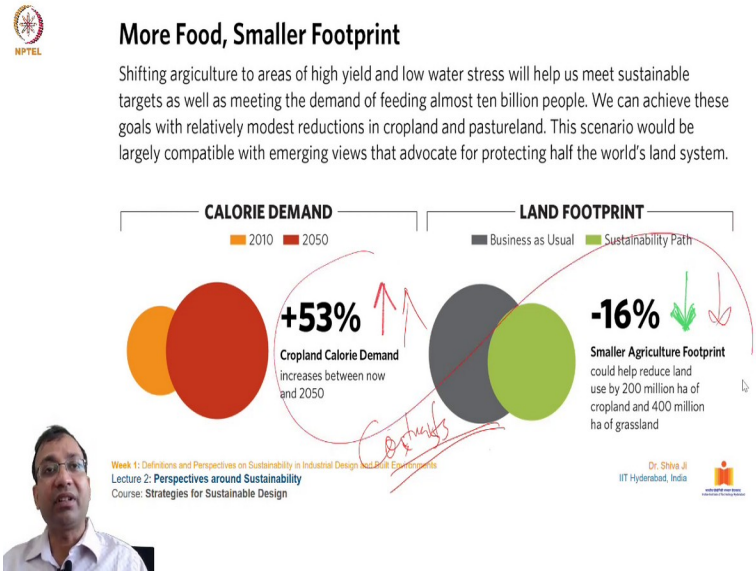

And in this one, here it talks about how the calorie demand like food of the humans has going to increase in the next few decades. So, from 2010 to 2050 it is projected that there will be increase of by like 53 percent and in the land footprint it is going to shrink by 16 percent. So, we see a contrast, we see a very high contrast over here. So, how this is going to up and this resources and the land is going to come down. So, how we will meet this demand is the challenge.

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So, we are almost at the end of this portion of this lecture three. So, what comes to your mind by seeing just this picture? Do not look at the text. It looks a very beautiful piece of photography, this picture is image from satellite, this shows the lithium rich water sitting in evaporation ponds in the country of Chile.

The lithium batteries which we generally use in every electronics, every laptop of the mobile phones, the pads, most of these they are just Bluetooth devices they carry high powered batteries. So, those batteries are powered by lithium ion batteries, so lithium has become a new aged material and element which is of very critical importance for our electronics gadget for powering them.

So, lithium being harvested over there and this satellite image. So, as a volunteer assignment to this lecture, may be you can go back to your house and you can Google more about what is lithium and how do they extract and what are the environmental repercussions of lithium. Thank you very much.