Fundamentals of Environmental Pollution and Control
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Lecture No. # 03
Definitions of Environmental Terms

I said all this you know we, that we are beginning to discuss about this environmental pollution some of you asked you know how pollution is different. Air pollution and degradation are different I mean this is one distinction that we would like to make here. Degradation you just write down degradation is, degradation is, degradation is about change in the life and life pattern of all living beings, of all living beings we generally call them as biota that we know of biota.

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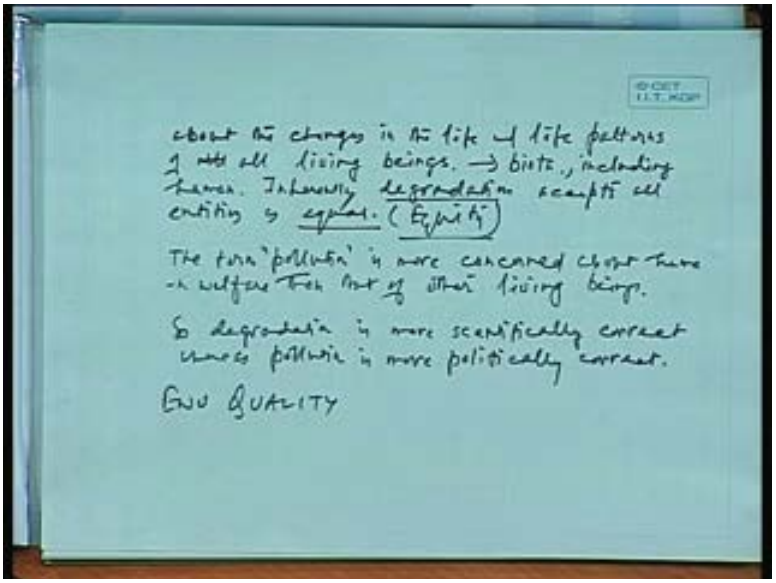

Degradation is you know you say particular aspect where it is prioritized you know it is, it includes human, including human. Inherently, inherently degradation accepts all entities as equal, all entities as equal, see this is one very important distinction that we would make. On the other hand the term pollution, term pollution, pollution is more concerned about human welfare than that of other living beings, than that of other living beings. So the term degradation, degradation is more scientifically correct whereas pollution is more politically correct. This is the distinction we make, seen a here okay here it says you know where it is this is about equity, this is very important about you know this equal the term, the term all entities as equal or you can say you know equity, equity. This term you know if you further study in the, in the, in environmental science, environmental policies, environmental methods this is particularly equity is a term which should be more and more relevant, in such cases we would also begin to appreciate that all other entities, all other living entities have almost equal right to live and survive as that of humans.

We are known that we are, that we are, that we are allowing or that we are protecting tigers is not basically we are doing a favor to the tigers but it is because we should leave that the tigers have equal right to live as that of a human, this is what is called equity. This equity is essential in environmental studies, whatever we have to see you know we also try to appreciate that any other living beings have also the same right. This would altogether change your thinking, that would altogether change your thinking in understanding about environmental and things altogether. Say so far we have always considered that you know humans as being supreme but when you are talking about environment in the large term, in the environmental pollution control or whatever we should always try to keep in mind that humans are not all important or humans are more or less equally important as that of any other beings, any other living entities or beings.

So this, this is what is you should know is very importantly about degradation and pollution that you know that you made a distinction when you we are, we talk of the term pollution what difference it makes, this is essentially the difference it makes. It has a very subtle difference, what subtle but very pointed difference, the pointed difference is the degradation is a term which we would generally if we are not focused more but more more appropriate but wherever is pollution is a term which is particularly more focused on humans and relatively less to other living beings or other living beings are any other natural objects, natural substances natural resources that we can generally talk of.

Now another very important thing is you say environmental quality this is, this is a term environmental quality, environmental quality, environmental quality. You just write down the term environment quality refers to the quality, to the quality of natural resources like air, water and soil fit for use, fit for use for one species but not, but essentially not, but essentially not for other species but essentially not for other species. For example butterflies, butterflies would love to survive, would love to survive on high mineral rich volcanic water to generate pigments, to generate pigments in their wings, to generate pigments in their wings but a human being would find the water completely unfit for use, completely unfit for use. The mineral water from a water bottle that we are used off, from a water bottle that we are used off may be completely unsuitable for consumption by birds.

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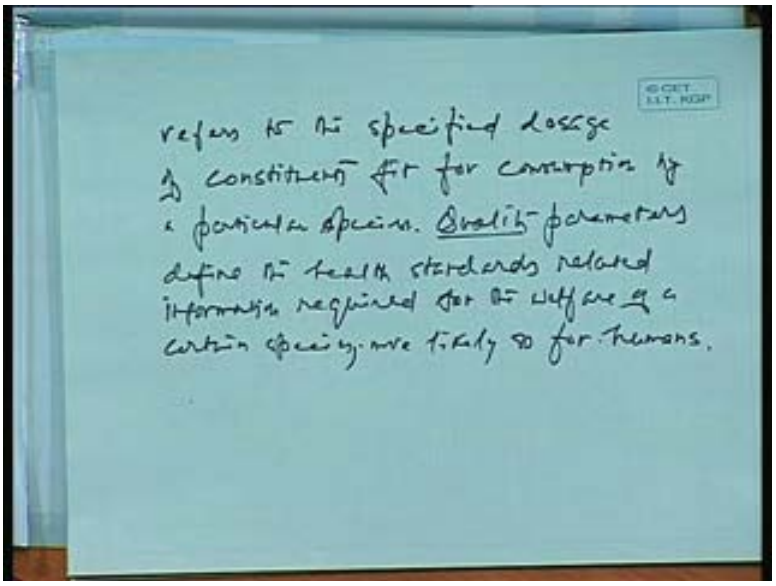

So quality refers to, so the term quality refers to, quality refers to, to the specified dosage of constituents, specified dosage of constituents fit for consumption, fit for consumption by a particular species. However quality parameters, however quality parameters define quality parameters, quality parameters define, define the health standard, health standards related information quality parameters define the health standards related information required for the welfare of a certain species more likely so for more likely so for humans, more likely so for humans, more likely so for humans, more likely so for humans, more likely so for humans. So say quality parameters is as I was discussing in quality parameter essentially say you know something like this, when I say that you know it will have this water should have a, this much of TDS say for human consumption we say this much of TDS. What I refer is I refer as water quality because this is the water which is fit for used by humans is not necessary that is not necessary to suggest that you know higher TDS water would be polluted water or would be degraded water but this water may be perfectly for use in another kind of living species which might find it for good use.

So whenever you are where an environmental quality is important, suppose when you are discussing wherever we are thinking about say a particular community in mind, something like say you know if you are talking about bird community, you need not have to supply them say treated water, you have to supply them a particular natural variety of water that may the quality that would be useful for humans but that may be perfectly useful for the birds, the birds will love it although the fishers may love it. So when we are talking about fishers, we would have to talk about the quality of water, quality of air or quality of soil that would be required for the sustenance of the fish population. When we are talking about the environmental quality of humans would be talking about the quality of air, quality of water, quality of soil that would help or that would be useful for the humans for their own consumption and their welfare, okay. So this is what, this is the, this is the definition you know this is the chain, these are the simple things what you know these are essential things which are need to be differentiated has to be spelt out very clearly, it's okay.

Now having gone from there is you know we should talk about little bit about this environmental movements throughout the world, a little bit of you know where would, this would be since I know that you know many of you would not have a course like this. So you know, so let us begin you know by seeing in the environmental movement.

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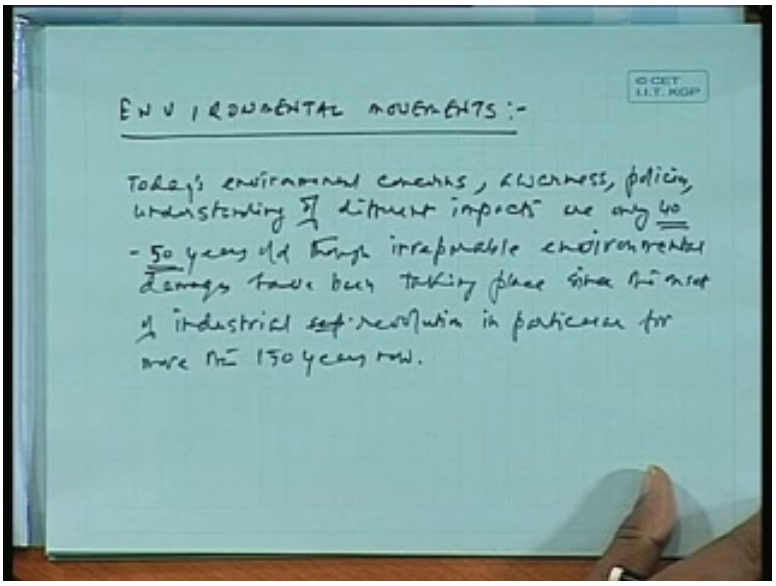

Environmental movements surprisingly though you know is surprisingly though you would not believe that you know that the, this today's environmental concerns today's, today's environmental concerns, concerns, awareness, awareness and policies understanding of impacts, of different impacts are only, only, only 40 to 50 years old, old though, though irreparable irreparable, irreparable environmental damages, damages have been taking place, have been taking place since, since the onset of, onset of industrial revolution. In particular for more than, for more than above, for more than 150 years now, for more than 150 years now, for more than 150 years now. So we can see this you know basically is the whole concern that we generally talk off 40 to 50 years old is quite a nascent subject as such you know though derived from basic science as an engineering, this not relatively very old subject, this is only 40 to 50 years old.

And essentially the subjects and the maturity of the subjects has only come about in last 20 years, is about last 20, 25 years that the maturity in the environmental concerns are come about. Before that it was basically very sporadic activities, activities at one place, some activities at one place but it has actually if you can see that you know there was a global awareness or there was a global requirement for better environment, it has only come taken place only last in last about 20 years' time. So is relatively new and there are few marks that we would also beginning to discuss here.

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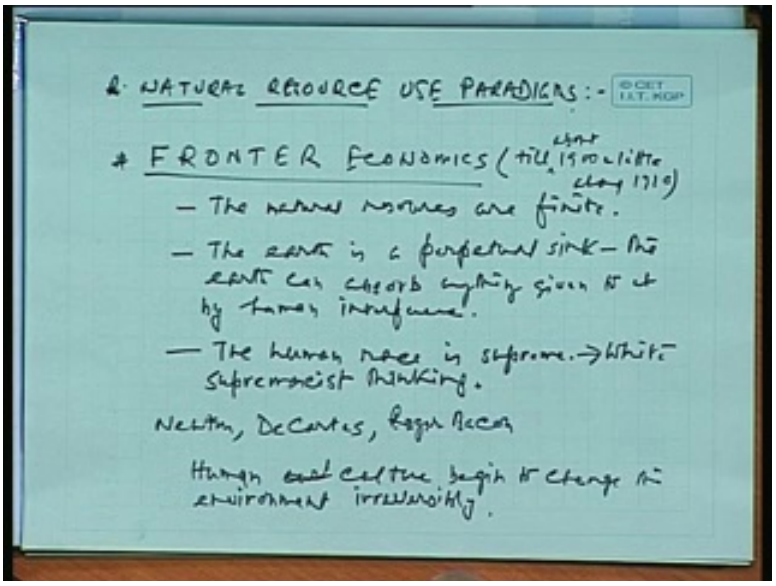

The first and you know this say a resource use, natural resource use paradigms, natural resource use paradigms, natural resource use paradigms you know we can see things like this you know here would say this as frontier economics, frontier economics. The frontier economics you know, which is you know is say being propounded you know is about frontier economics if we just see till it was till, till about say till about say till about 1900, 1900 till about 19 its cannot be said very specifically say with till about 1900's and say little ahead say about say about 1920. Yes, we generally see that how the natural is economics resources where being used, just to see here is the first and foremost thing is to be see is frontier economics. What we use to, what are the paradigms seen in the frontier economics, what was the basic idea. Idea was this, the natural resources, natural resources are, natural resources are finite, natural resources are finite, natural resources are finite they can be used as much as possible without limitation.

So you know this can be that was the basic understanding that the natural resources are finite and this you know the earth, the earth is a perpetual sink, the earth is a perpetual sink. That means the earth can absorb, the earth can absorb whatever is given to it, the earth is, the earth can observe any substance or anything given to it, given to it by, given to it by human interference, given to it by human interference. The natural resources are finite, the earth is a perpetual sink, the earth can absorb anything given to it by human interference say hence third and the very critical one is that the human being race is supreme, human race is supreme, to be more, to be more specific on this that this is basically a white supremacist, white supremacist thinking that whatever the white people do, whatever the white people do they are the best, they are the supreme in of the world they are the supreme I mean they are the supreme race, the human race, the human race is supreme I mean to specifically if you say human race at that point of time about 1900 the basic voice that one can hear at that point of time was basically the voice of the white, white academics, white intelligential so it's basically a white supremacist thinking that human race is supreme.

See this three things you know this is, this was the first thing, this was the basis of frontier economics, frontier economics began to explain this by like saying this, this is the natural resources and the, and the supporters of them, supporters of them were is with then Isaac Newton himself, Newton then Newton supported them then you know this De Cartes was also a supporter of the movement there and many other you know many other mathematicians you know physicist begin to, they use to think that you know this the frontier economic believe in frontier economics. So you know here in this case you know where you can see this human culture human culture begin, begin to change the environment irreversibly, irreversibly. This is still, still taking place, I would say you know it's a dominant social paradigm I mean this one this is basically a many people use to believe.

Now there are also many people who believe in frontier economics I mean in the sense that you know they believe that you know the having full dependence on growth, on physical growth is basically supporting frontier economics, it is about basically supporting frontier economics. So you know this is the initial paradigm that we have discussed you know in frontier economics and this the Roger Becam I think no other, I was forgetting the name Roger Becam, so these are the, these are the scholars, the scientists, the philosophers who is to believe in frontier economics and it still he may you know some where about 1920 we still could think of that the frontier economics being a very prominent you know major natural resource used paradigm.

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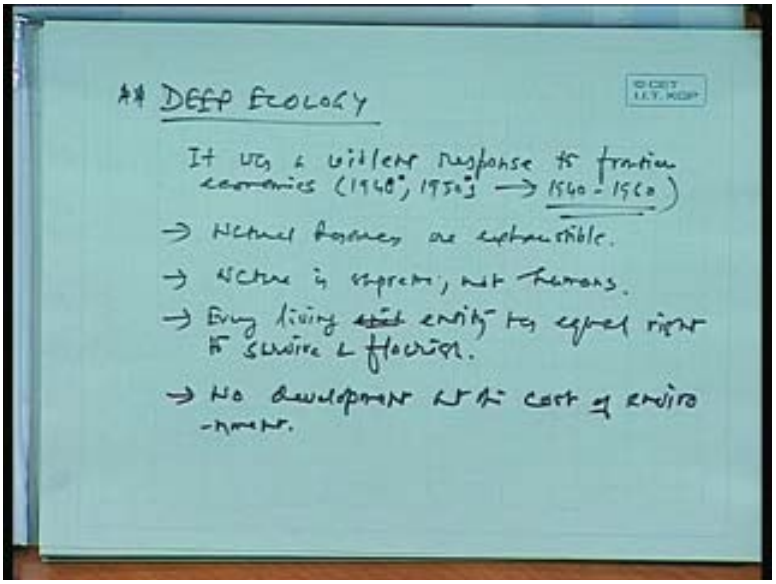

Having followed this you know at about this, you know 1920's and onwards, now you generally find response to this frontier economics. What is said is as deep ecology, deep ecology. This deep ecology is you know this deep ecology under this natural resource paradigms is you know another this is deep ecology that we generally talk about, deep ecology was, it was a, it was a, it was a violent response, response to, violent response to frontier economics, economics and it has you know the reservation of this can we found can we see is you know 1940's 40's 1950's like this. So you know about for say 1940, 40 you say 1960 you can write it say about this time we know we just see a violent response to frontier economics where it says that natural resources are

finite, natural resources are exhaustible, exhaustible, nature is supreme, nature is supreme not humans.

Every living, every living, a every living entity, every living entity has equal right, equal right to survive, has equal right to survive and flourish, has equal right to flourish and no development I mean a counter to frontier economics no development, no development at the cost of, at the cost of environment, no development at the cost of environment. And the public reactions were so huge that you know in many cases, this could be you know many industrial sectors are have to, were have to be closed because of this you know there are many things that could be you know it was actually you know by this time about frontier economics when it has matured, by that time a sudden economy has generated that means you know economy in the sense that unless you also suppose for India say you know if we have to employ all our people we have to, we have to exhaust, we have to use our natural resources and only then we can provide them some kind of income some kind of sustenance. So here the deep ecology was exactly countering that in the sense that you know it was completely opposing the philosophies of frontier economics. So here in case of cases like this, we can see that you know we just generally a combined response of this frontier economics and deep ecology we can see, we can find out a reform philosophy.

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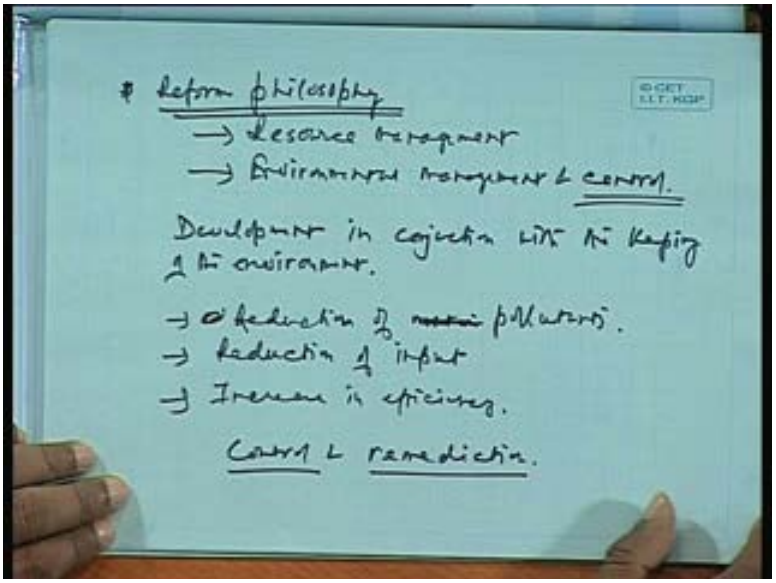

Reform philosophy which is you know we generally find it in the manifestations like resource management, resource management and environmental management and control. Reform, reform philosophy under this reform philosophy what we have done is so the idea is here will also develop, development, development in conjunction with the keeping of the environment. So, this is basically a compromise between frontier economics and deep ecology, this is basically a compromise between frontier economics and deep ecology where you have made a compromise but here also again a one thing, the resource management what it said is challenging, reduction of pollution, basically how it was met how it was carried out reduction of, reduction of material, reduction of pollutants. So when the industries were called, were asked to reduce pollution what they did is they only reduce pollution. This is the initial response, reduction of pollutants,

reduction of pollutants, reduction of input, reduction of increase in, increase in efficiency but the whole emphasis was on all environmental control, environmental control, control and remediation. So is basically the control after the pollutant has been caused it will be controlled and remediation. The basic focus of these two aspects of reform philosophy was that to control and remediation, the control and remediation. What you see next is you know from this, you know the reform philosophy is then it comes that you know this is, this is basically all this is you know that all this frontier economics, deep ecology and reform philosophy, this is all called the evolutionary track of, evolutionary track of environmental movement.

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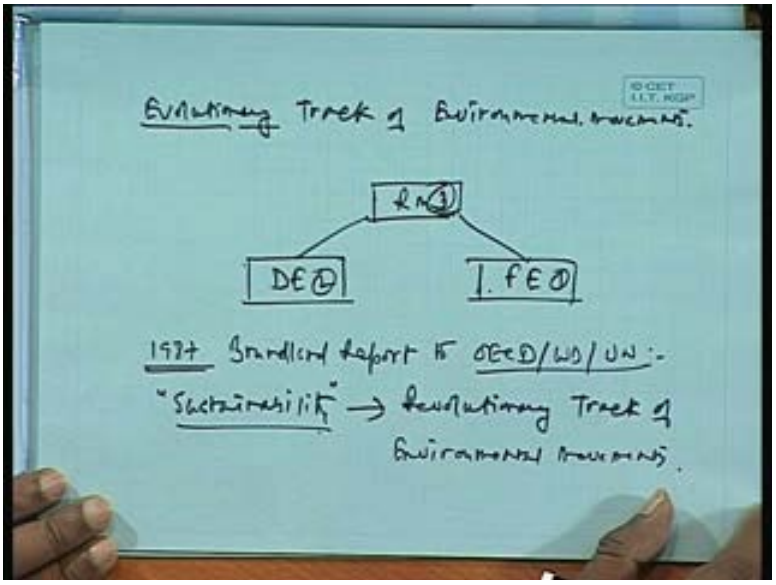

So, what we mean by saying is that you know this we can see you know a particularly, this reform environmental this, the deep ecology and then deep ecology, deep ecology and this frontier economics, is frontier economics together it combine together to form a compromise of this, as this you know resource management RM. This is, this is all know as you can see this is called evaluation, this is evolved. First is you know deep ecology, the first is frontier economics 1 then 2 then 3 this combining this you know this is the, this is how it has evolved. So this is known as evolutionary track of environmental movements but after that what we see is and today's world about you know in 1987, in 1987 that the Brundtland report to OECD, OECD and to say OECD World Bank to UN is that Brundtland report revolutionized a certain kind of thinking in environmental movements. Till that time what we have seen is the concepts like sustainability brought in, this is called the revolutionary track of, track of environmental movements.

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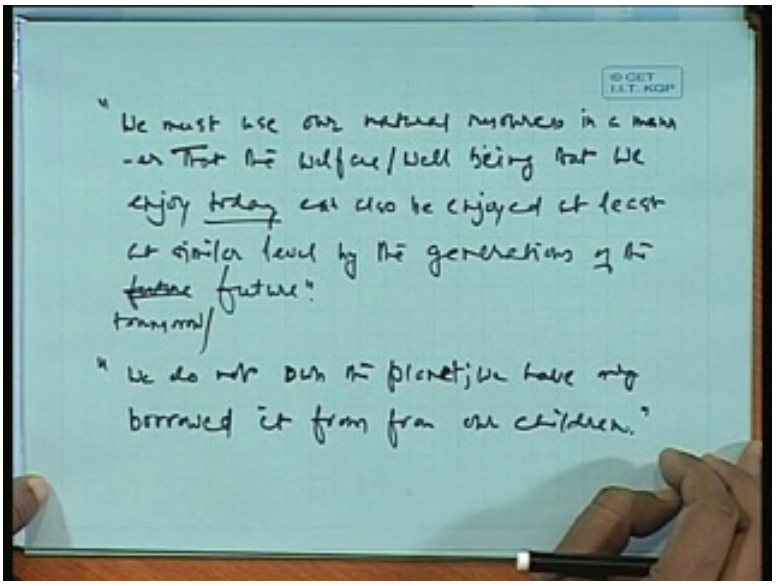

Brundtland report of the, which is it defines sustainability, it begins to define this first work begins to, begins to talk about sustainability and the sustainability is defined by on the line of this Brundtland report as this, must use our natural resources, we must use our natural resources in a manner, manner that the welfare and well-being that we enjoy today can also be enjoyed at least at similar level by the generations of the future, generations of the future. We must use our natural resource in a manner that the welfare and well-being that we enjoy today can be also enjoyed, can be enjoyed at least at similar level by the generations of the future or generations of tomorrow or future. Sometimes it was written tomorrow, tomorrow as it can be directly in line with today, tomorrow or our future I mean this is that this say the, say the very another passing comment that is you know we do not, we do not own the planet we have only borrowed it from our children is another very interesting you know this two titles you know that would be sustainability as discussed about we do not own the planet, we do not planet, we have only, we have only borrowed it from our children. So we have to give them back, so we have to give them back and as we have taken from them.

So this is the idea of sustainability this particularly, this sustainability term is there are few aspects you know this is when it was in 1987 you know first this you know this sustainability was brought in it was a term which was more philosophical in nature, whether actually you know is basically whether this can be achieved, whether this can be actually you know practicable to say and it is extremely difficult to work on a sustainability as such. How else, how sustainability can be achieved without actually, without, without actually going for higher growth, higher material growth, this is a big question. So this if we are using say if we are using energy at some level, how without reducing that energy level we can think of sustainability in the future. If we are keep, if we keep on increasing the use of natural resource like fuel at the same level and more in the future, how else we are going to conserve the fuel for the future. Is it possible, I mean it is not possible in such cases? So in case you know there are, there are certain things that also taking place though it is a term you know generally looks very philosophical under surface but they are all efforts and there are number of very praise worthy efforts that have been done to understand

the sustainability and how this sustainability can be actually be worked up on, can be thought about.

See one big important thing is that you know the world is not going to change overnight by you know by a movement, environmental movement of things like that the things that have been accumulating that have changed the world throughout a period such a long period cannot be changed within a, within few 100 years or even say you know even more that or even say know the usual estimate that you make it 50 years or so. What is possible is suddenly making a progress toward that line, whether the most important thing for most of us is whether we are doing things more right things today than we used to do yesterday or whether we are doing less wrong things than what we did yesterday, that is the basic question.

Now if we are going to reduce that if we are going to reduce in the manner that is sufficient to say that we are going in on the path of sustainability, you say it's a very strong very applicable word now a days in the world you will find this world word being used in various forms. The basic connotation is this, the word sustainability would mean that whatever we are being able to do today whether we will able to do it tomorrow. The same things is a big question because you know in the situation that I have explained in the first class itself that our natural resources are depleted, depleting at a very fast rate and this is a fact that is generally I mean accepted by all, all kind of people all over the world. Every day it is being said, everything it is being told to somebody what whether we are taking the right steps or not would actually depend much on this concepts. And this is, these concepts should lead to a better human behavior, a better functional use of the earth, the better functional use of our planet and so that you know everybody can sustain, everybody can relatively live together.

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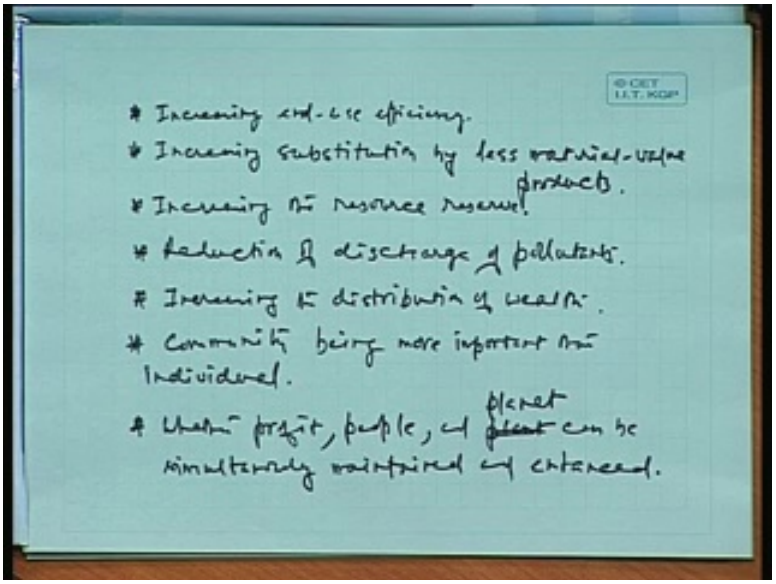

So this is, thus the sustainability the basically there are when it, if you are an engineer what sustainability would mean to is you know there is, there is see is called the increasing, increasing end use efficiency, increasing substitution by material value products, substitution of sub

substance you know the same work if that can be done by a material which uses less material that substitution would help say you know suddenly the use you know we can see think of a material substitution say the increasing the resource reserve enclosing the resource reserve, when we are talking about say know we are if we say that our reserve of petroleum is going high everyday becoming high every day, we would say that you know we are towards the path of sustainability. That means we are, we are being able to maintain or we are paying you know we are, we are in a position to increase the level of the natural resource. That is one very important thing about this, about environmental pollution then you see know this reduction of another very important thing about environmental is and this particularly is that I have also said in the first class is you know increasing wealth community being more important than individual.

These are the aspects you know which are, which are you know which leads to sustainability this is what is and the finally another very important thing that is you know is coming out to in the physical sustainability aspects is whether we can maintain whether, whether, profit, profit people and planet can be whether profit, people and planet sorry planet that is earth can be simultaneously maintained, maintained and enhanced and enhanced whether profit, people and planet can be simultaneously maintained and enhanced. This would remain the most important part, this would remain the most important part about sustainability all right.

So, we will stop here today because you know we will go to the next topic, I mean you know any other thing that is you know we will begin about we will start with water pollutants first. Now water then we will go to soil then we will go to air, so we will start the water pollutants, typical water pollutants in the next class. And any questions so far, if you have found anything which cannot be which is not clear to you. And okay I mean the, read some books, read some papers also you know this that book of mine that is I was telling about you know you can just you can think of this book, you know this is a book which is which you can use it as reference.

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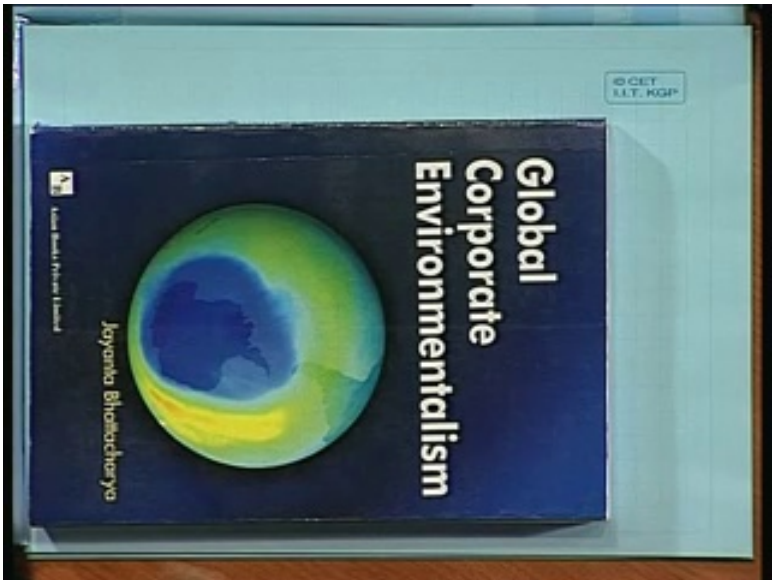

You know this particular book, you know there are many aspects of it which has been explained you know what I have explained for first 2 3 chapters, for 4 5 classes generally I deal with this book. I will go back to a standard engineering, environmental engineering text book in the next class okay, right. I think with this, all this you know we stop at today's class, in the next we will begin to, we will start by beginning water pollutants, right.